

1/49

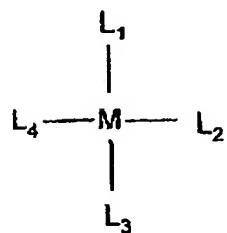


Fig. 1a

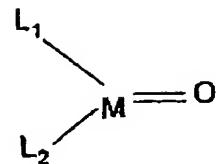


Fig. 1b

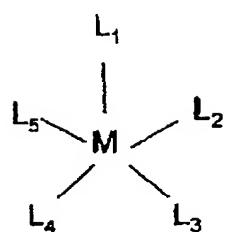


Fig. 1c

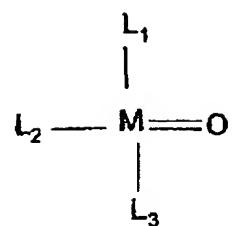
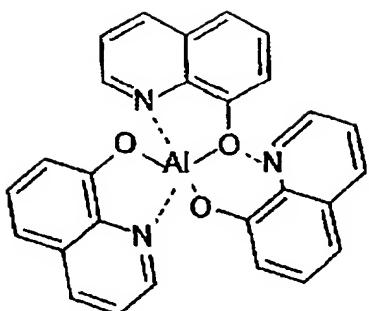


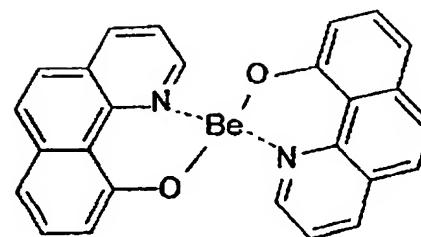
Fig. 1d

Fig. 1

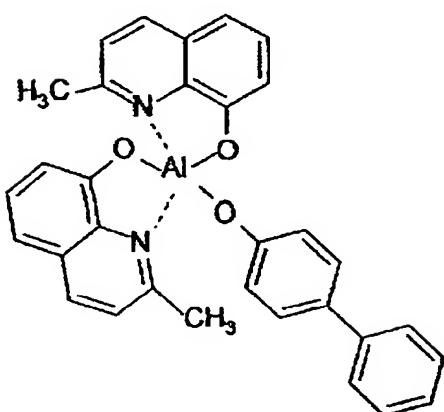
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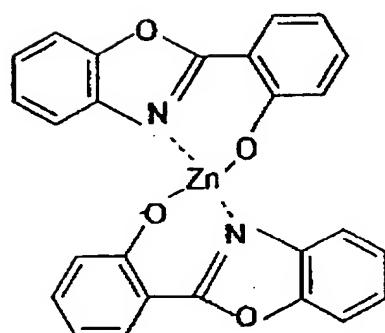
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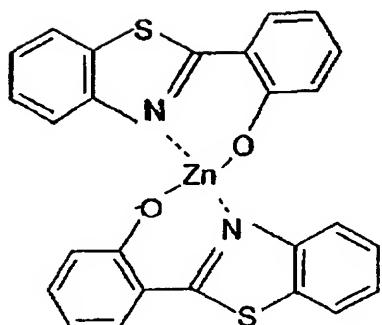
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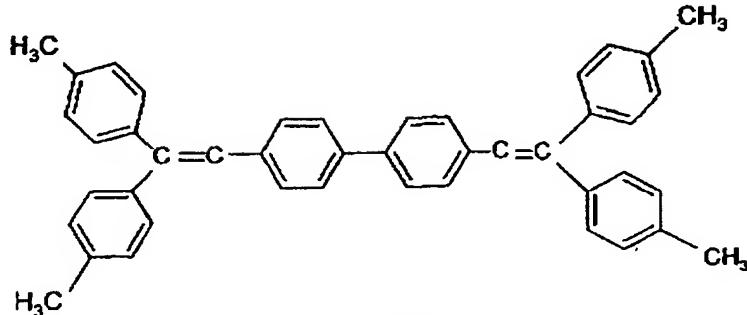
BA1q1



ZnPBO



ZnPBT



DTVb1

Fig. 2

3/49

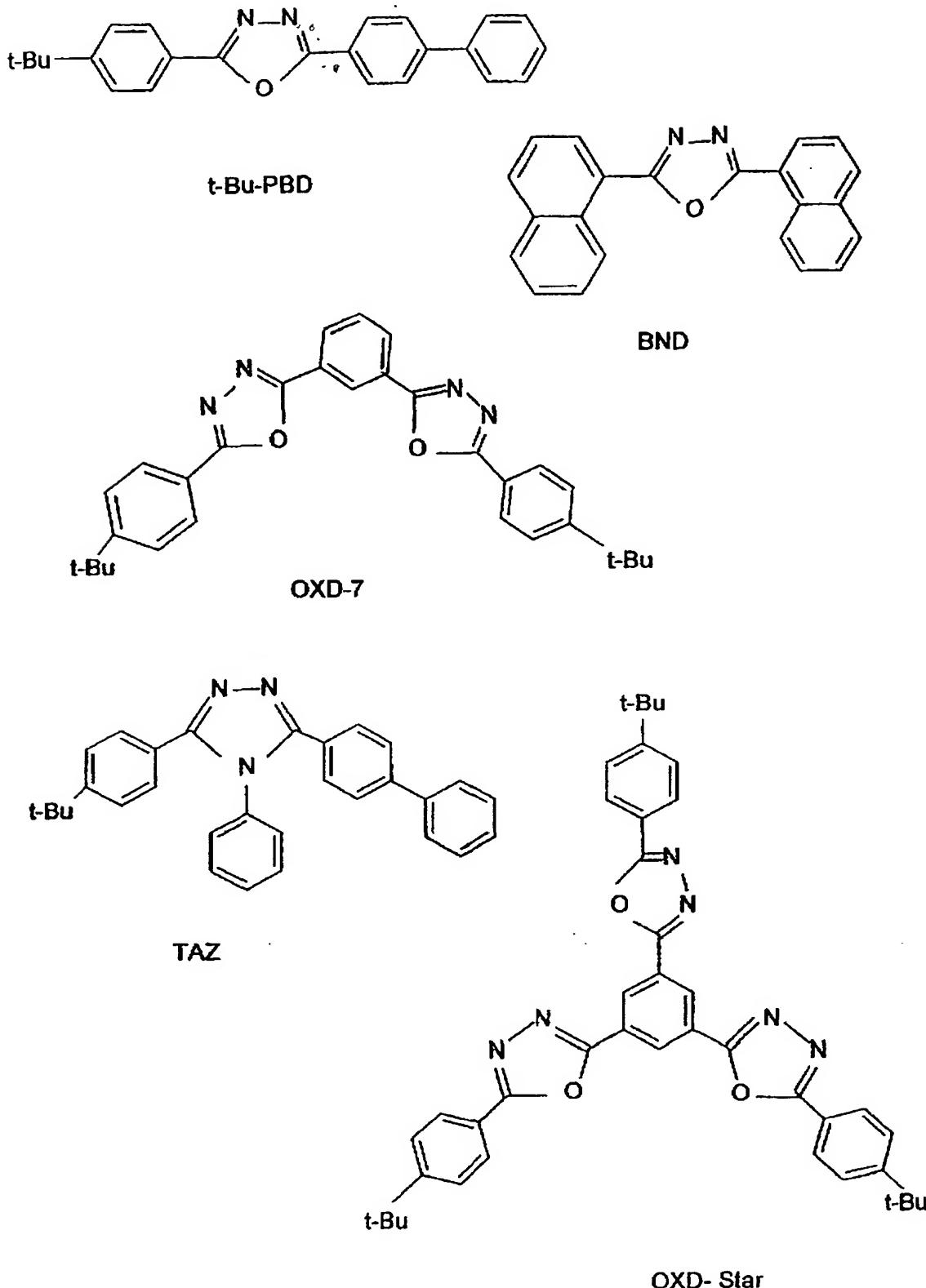


Fig. 3

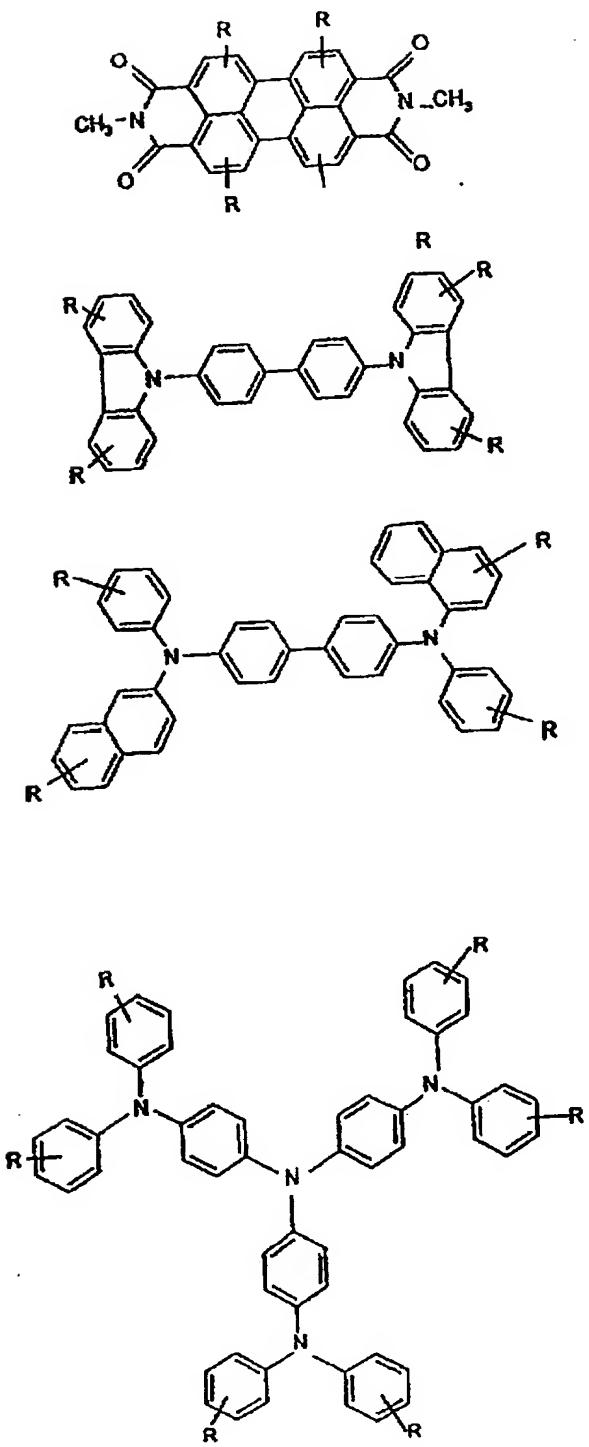


Fig. 4

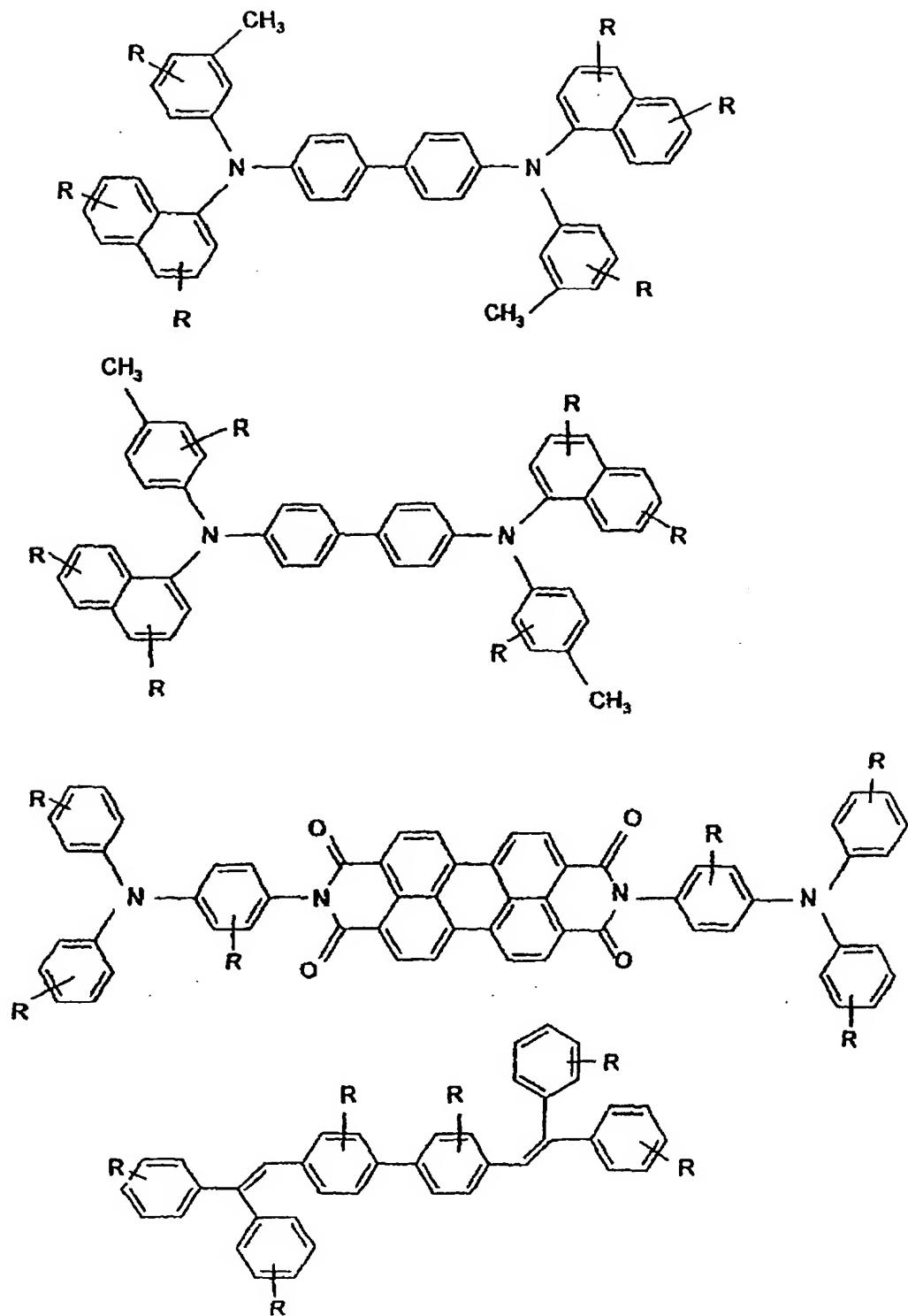


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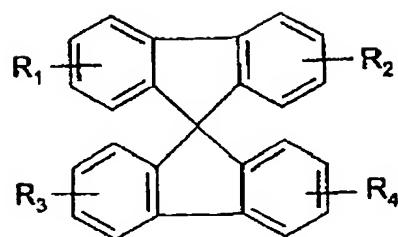


Fig. 14a

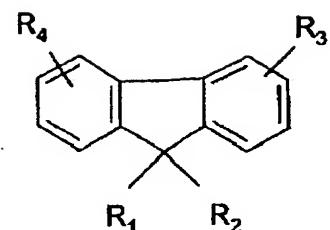
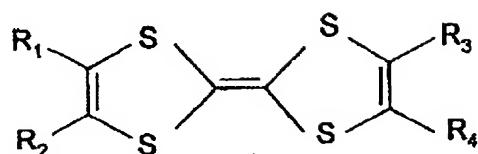


Fig. 14b



or

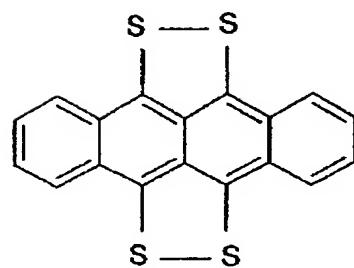
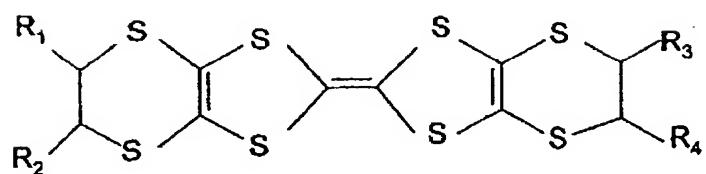


Fig. 6

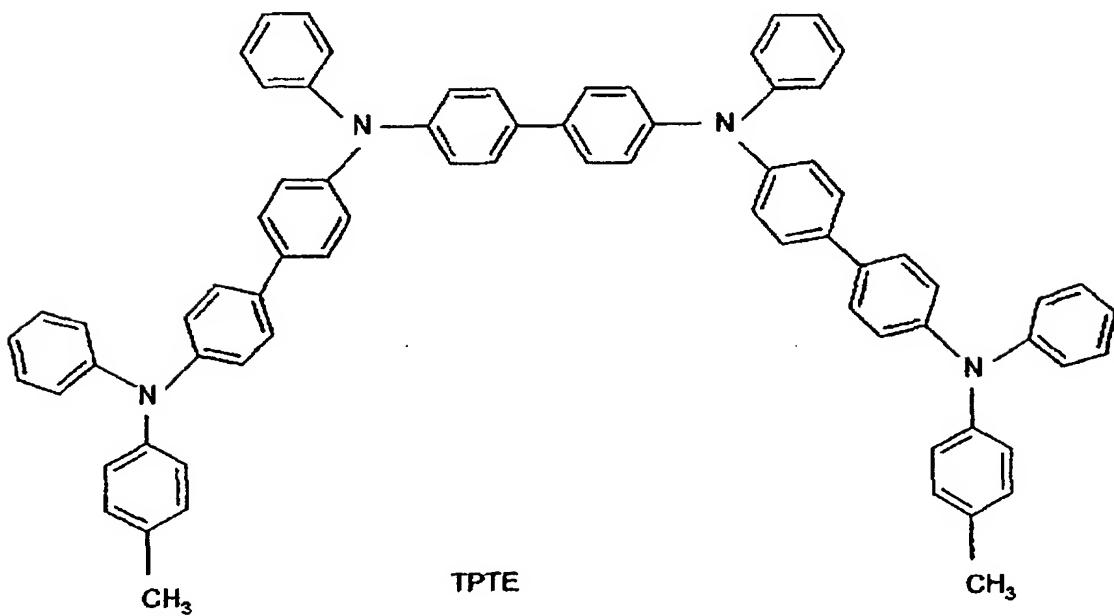
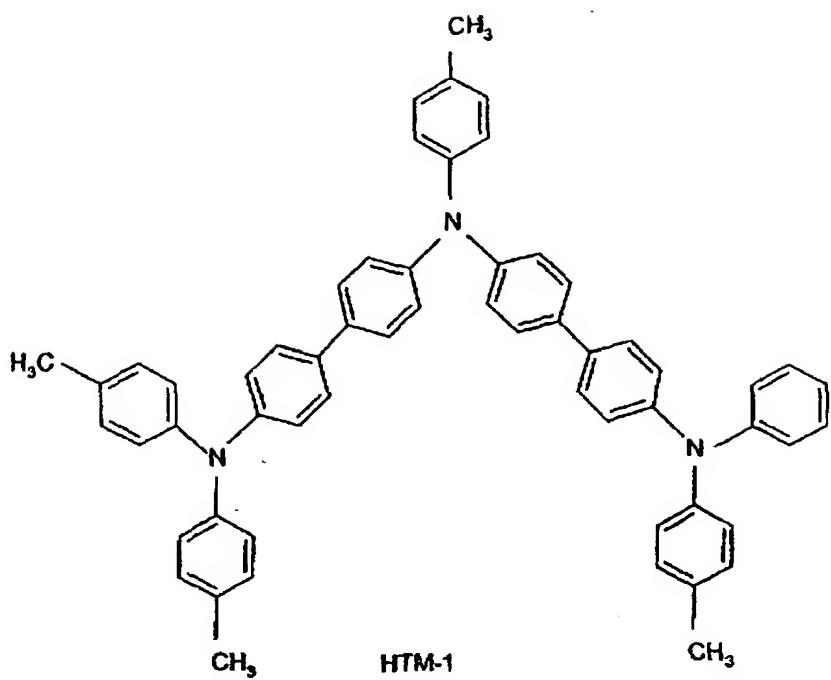
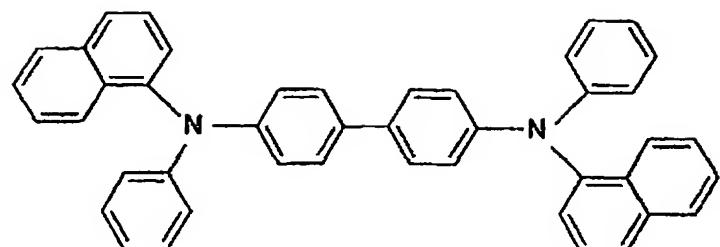
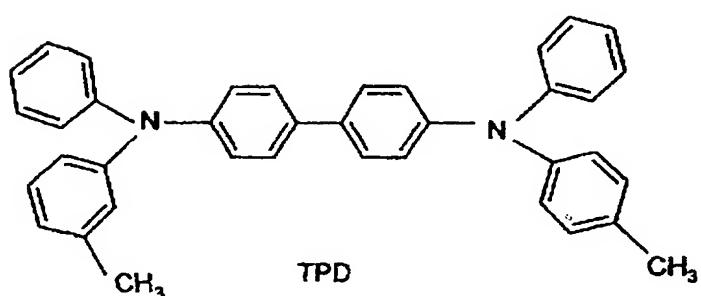


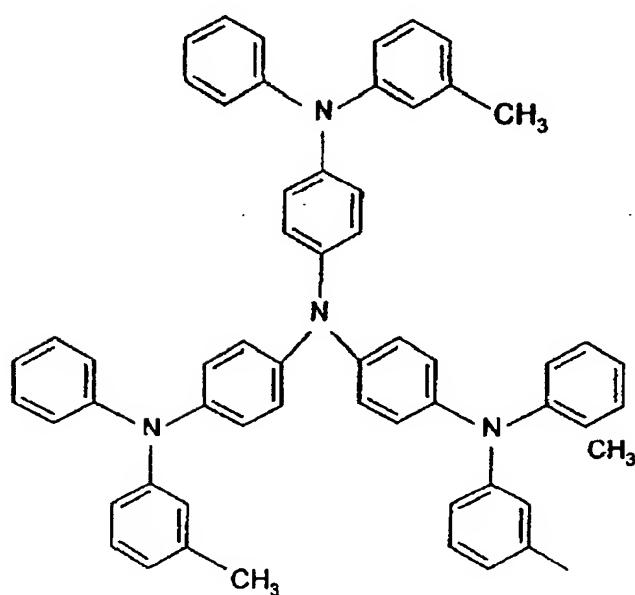
Fig. 7



α -NPP



TPD



mTADATA

Fig. 8

9/49

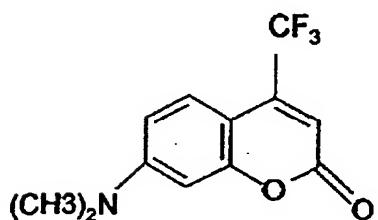
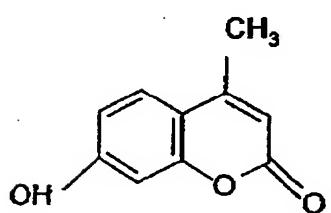
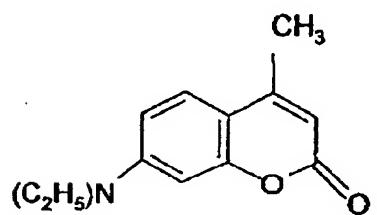
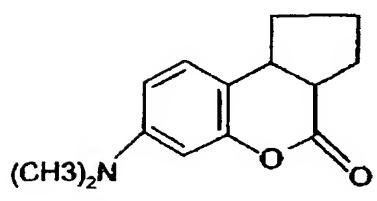
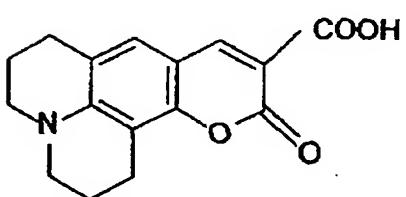
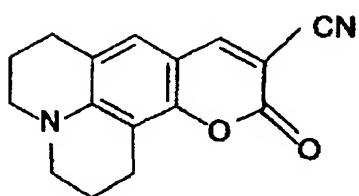
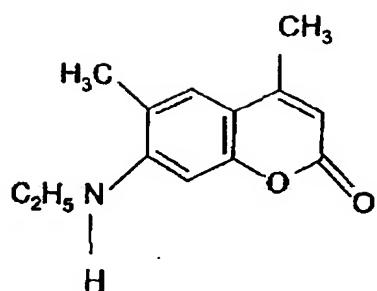
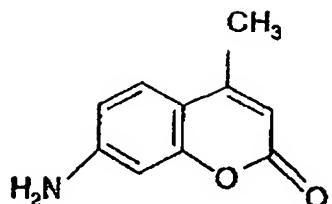


Fig. 9

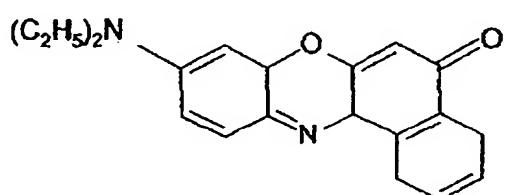
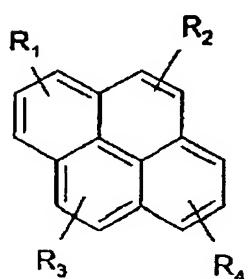
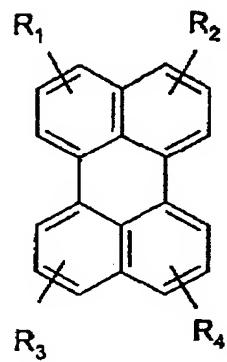
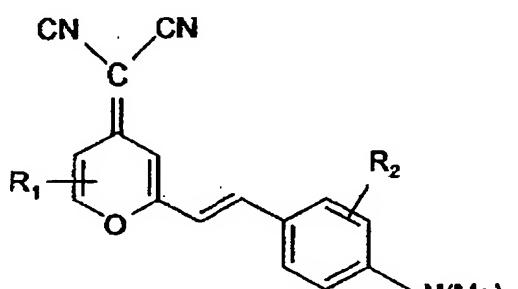
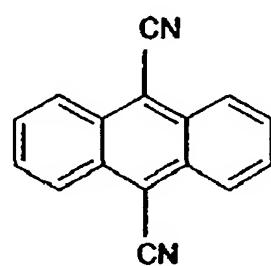
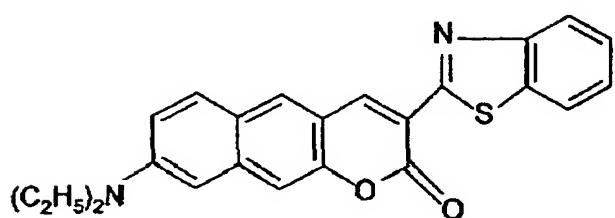
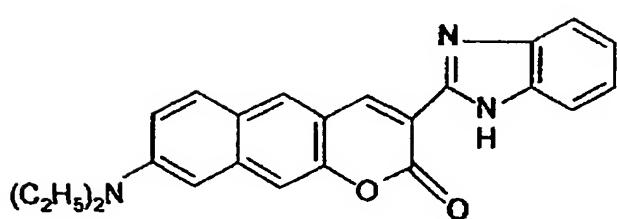
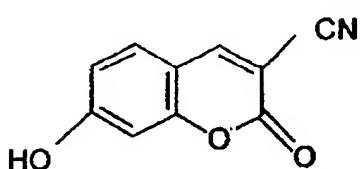
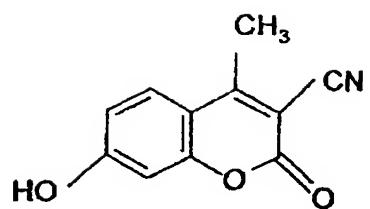
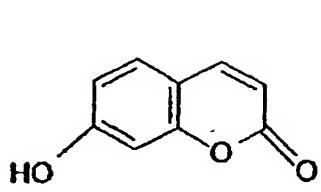


Fig. 10

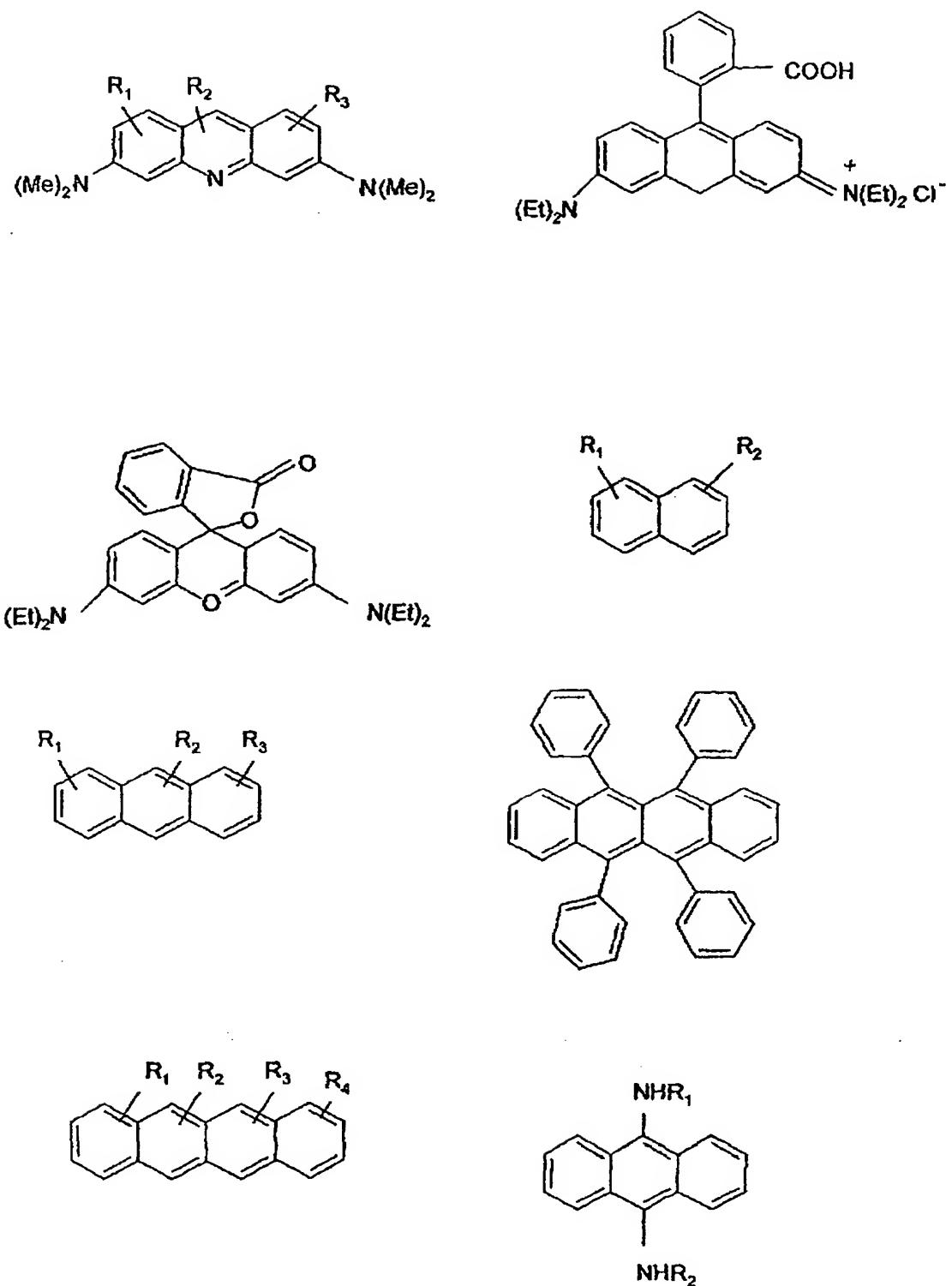


Fig. 11

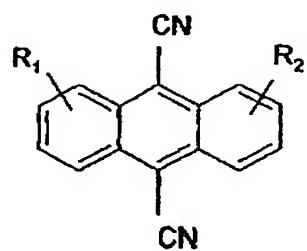
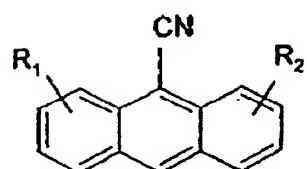
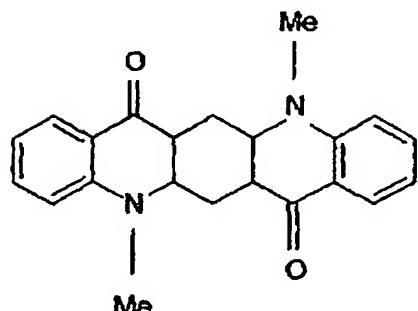
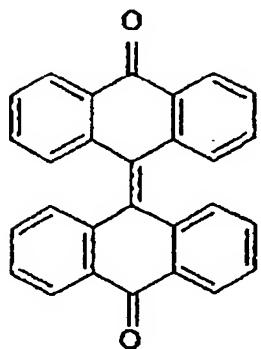
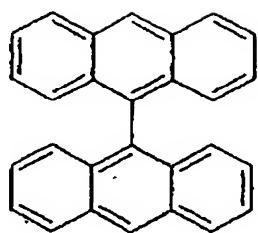
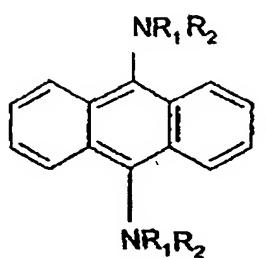


Fig. 12

13/49

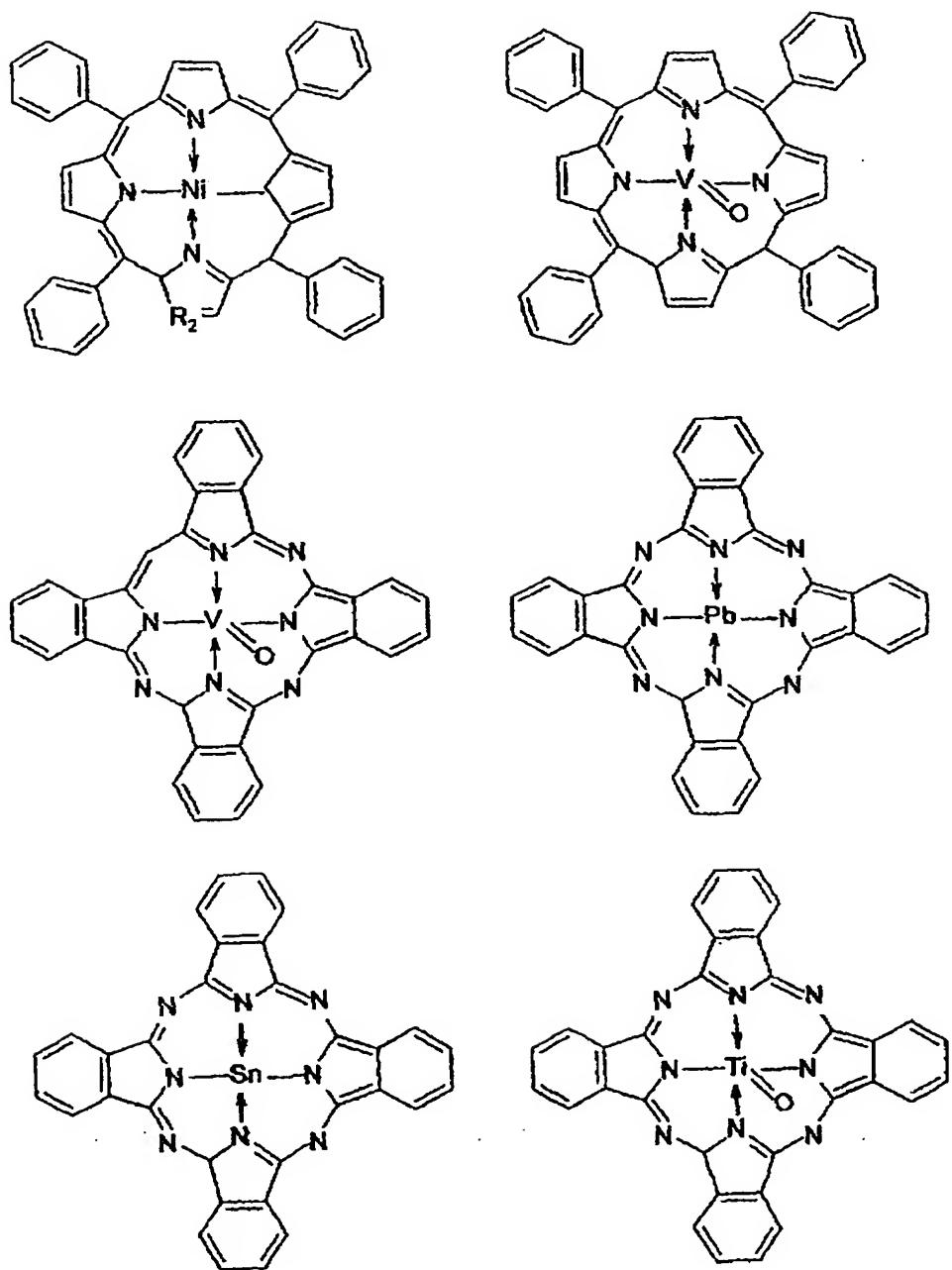


Fig. 13

14/49

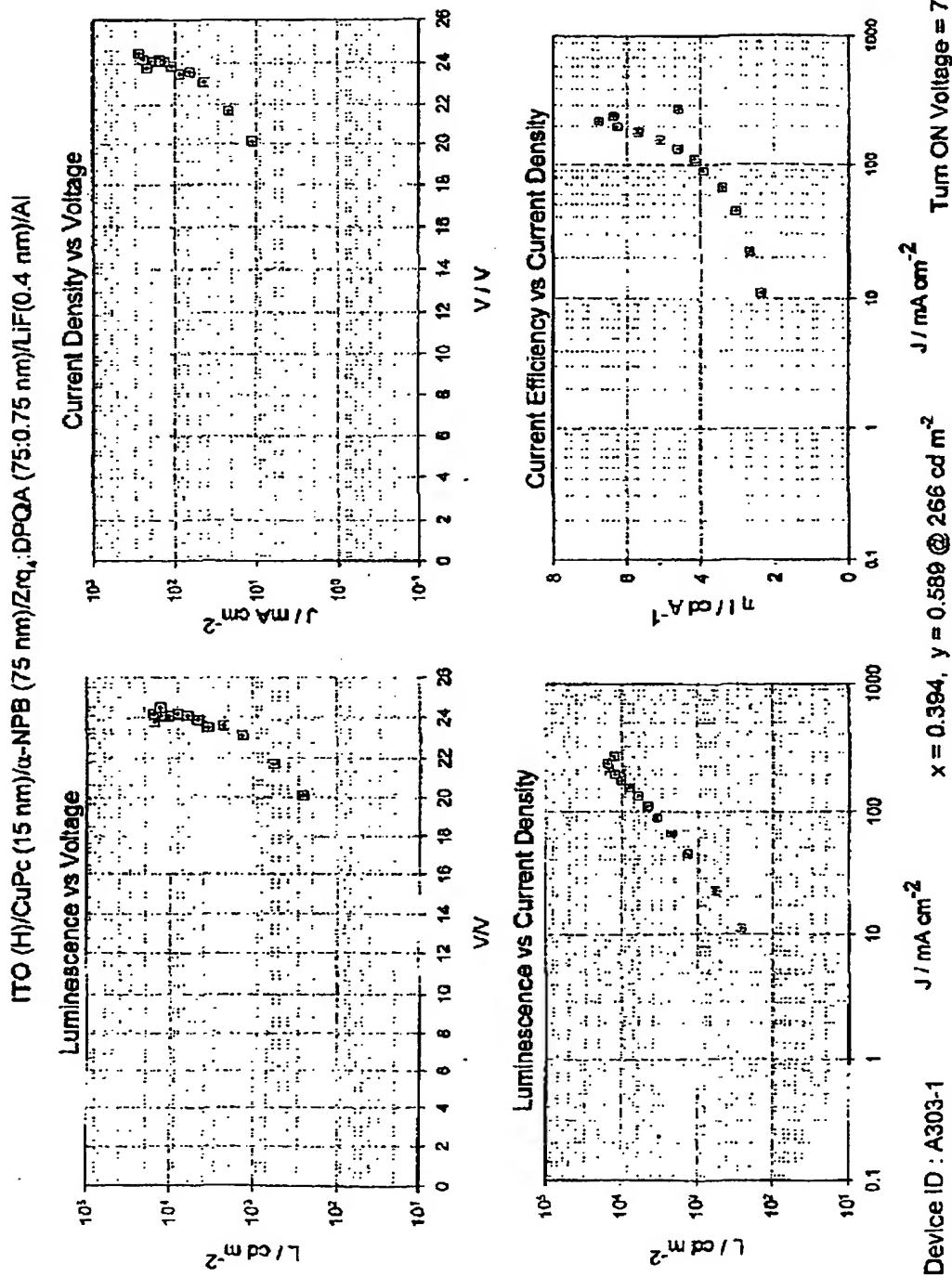


Fig. 14

15/49

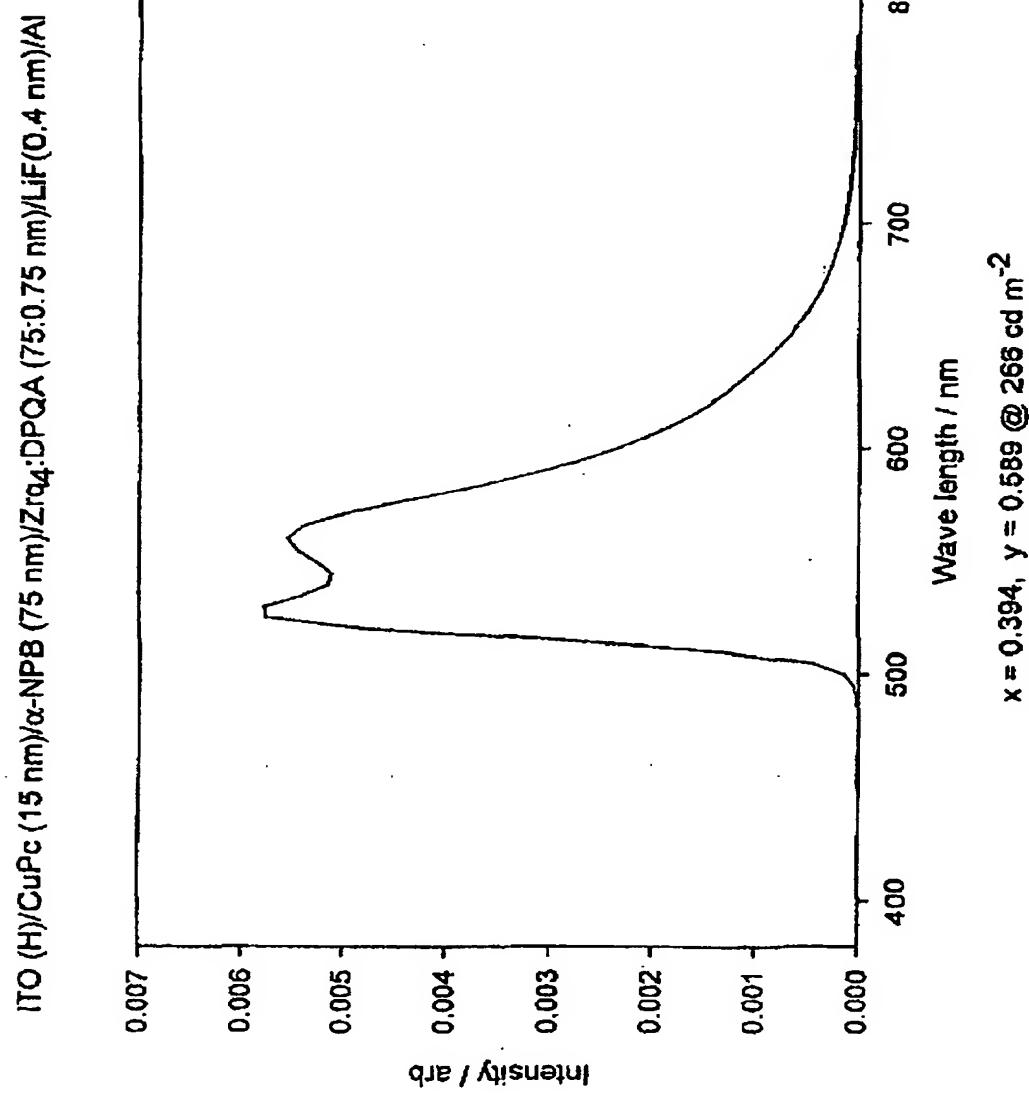
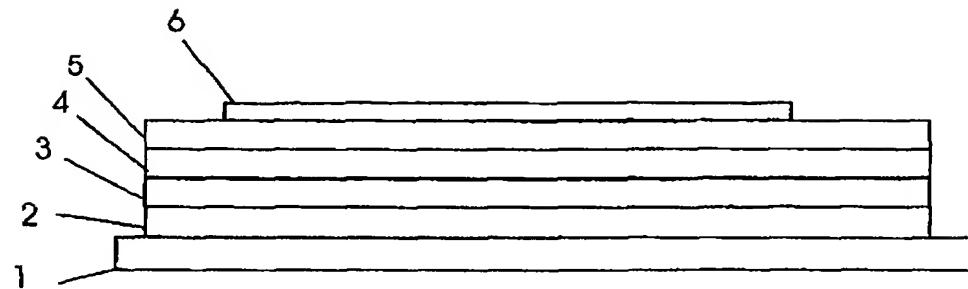


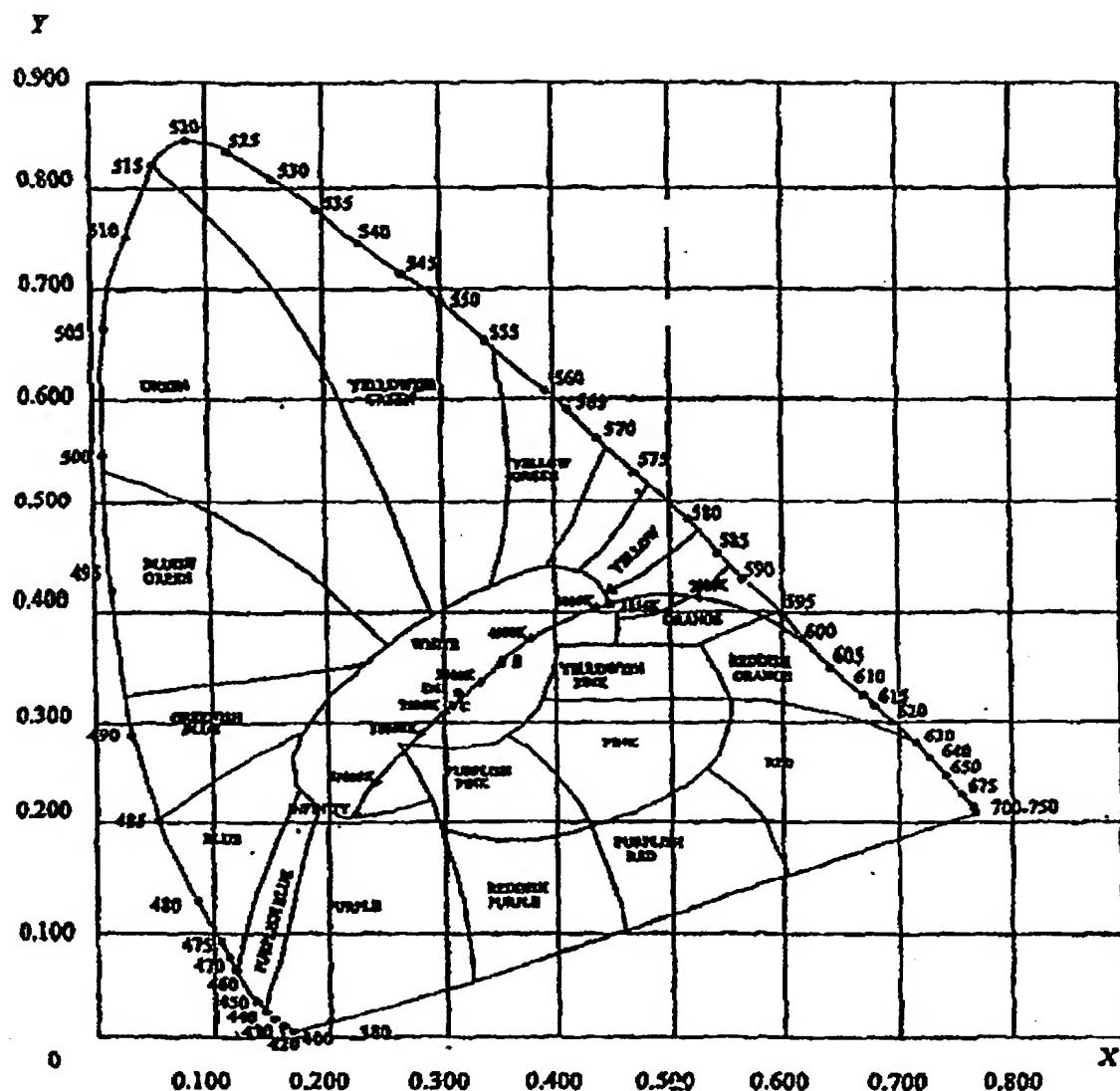
Fig. 15

16/49



1 is ITO; 2 is CuPC; 3 is α -NPB; 4 is Zr q_4 :DPQA; 5 is LiF and 6 is Al.

Fig. 16



CIE 1931 x,y chromaticity diagram showing approximate position of perceived colours

Fig. 17

18/49

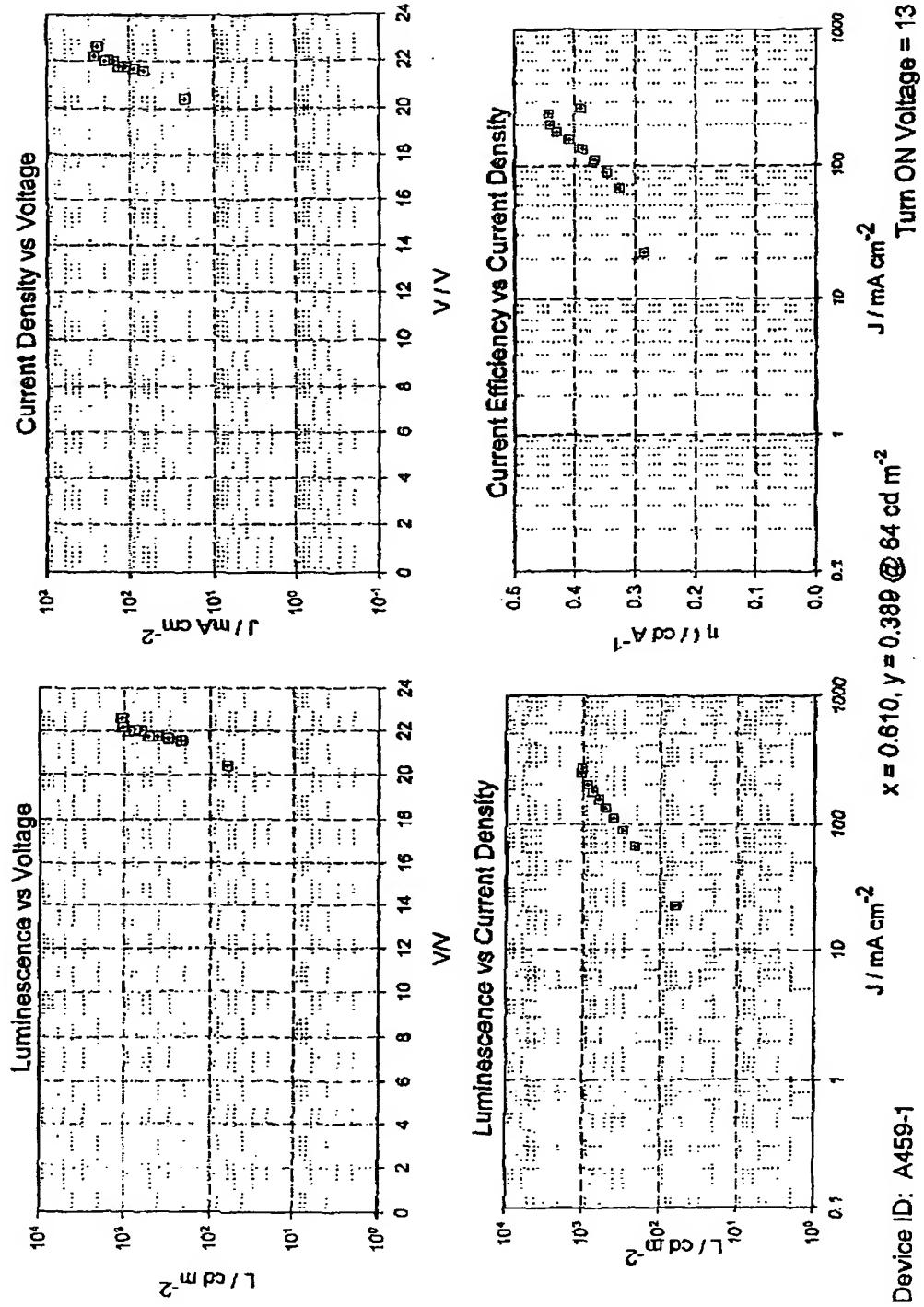
ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)/Zr_xNi_{1-x} (75.0.38 nm)/LiF (0.4 nm)/Al

Fig. 18

19/49

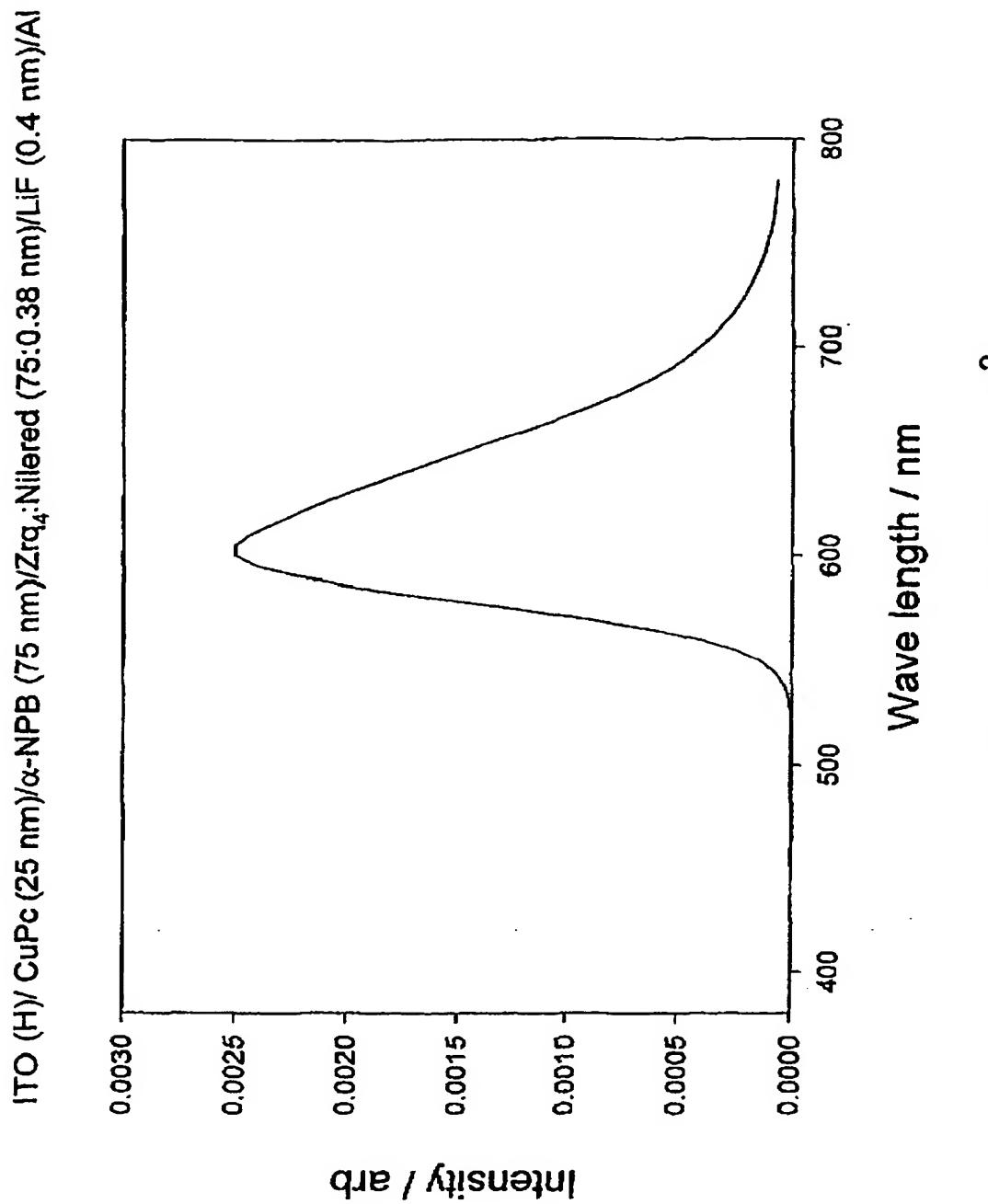
 $x = 0.610, y = 0.389 @ 64 \text{ cd m}^{-2}$

Fig. 19

20/49

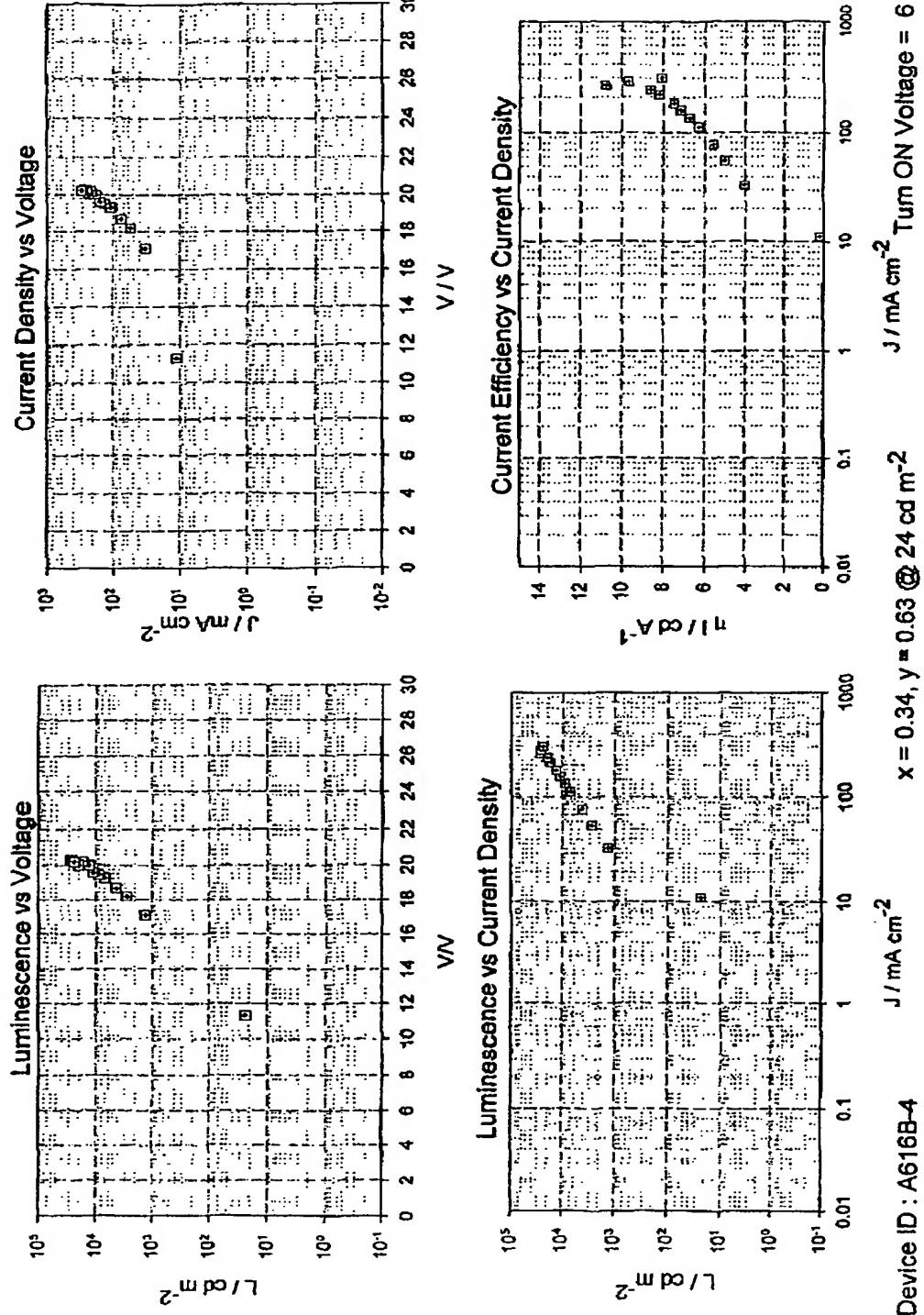
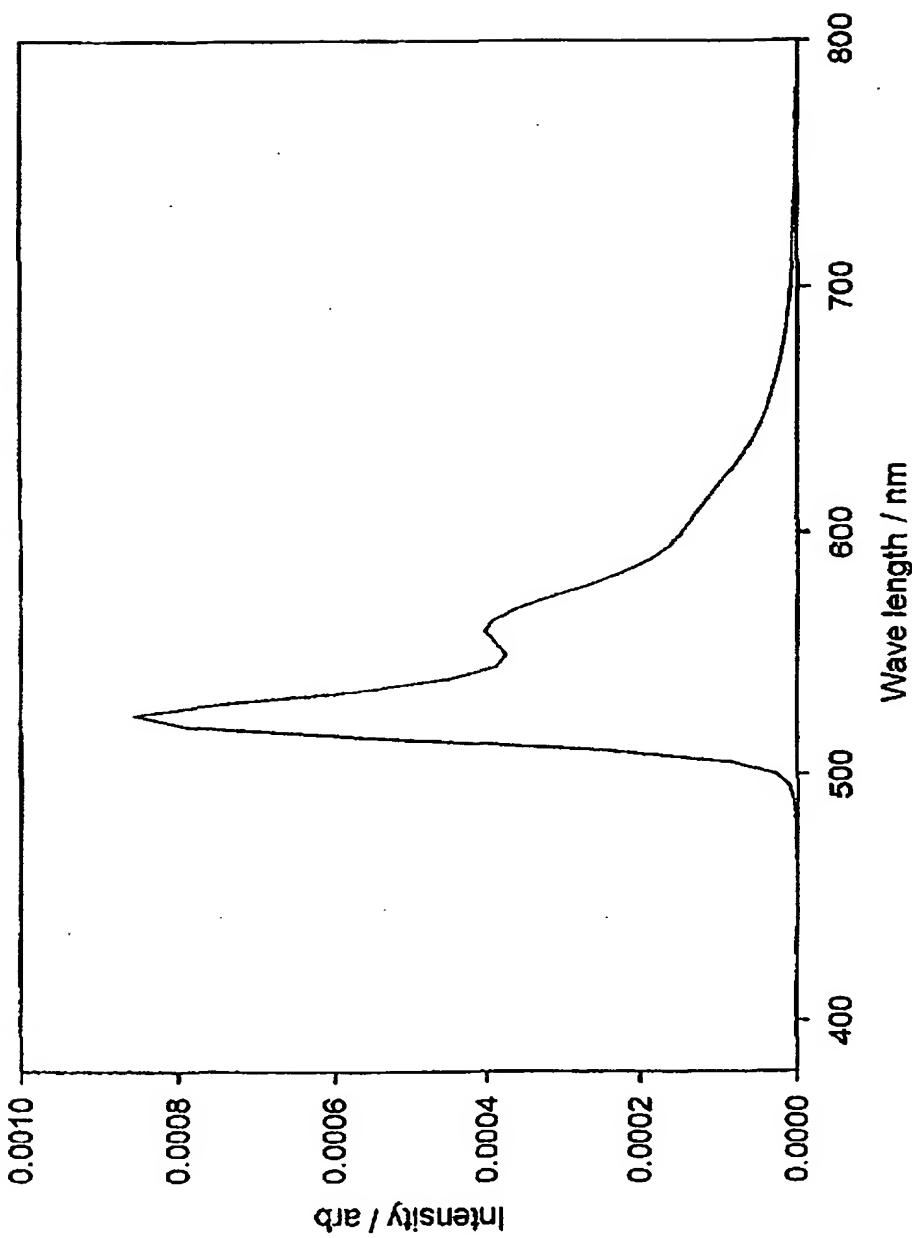
ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)/Zrq4:DPQA(60:0.4 nm)/Zrq4 (10 nm)/LiF (0.4 nm)/Au

Fig. 20

21/49

[ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)Zqq4:DPQQA(60:0.4 nm)/Zqq4 (10 nm)/LiF (0.4 nm)/Al



$x = 0.34, y = 0.63 @ 24 \text{ cd m}^{-2}$

Fig. 21

22/49

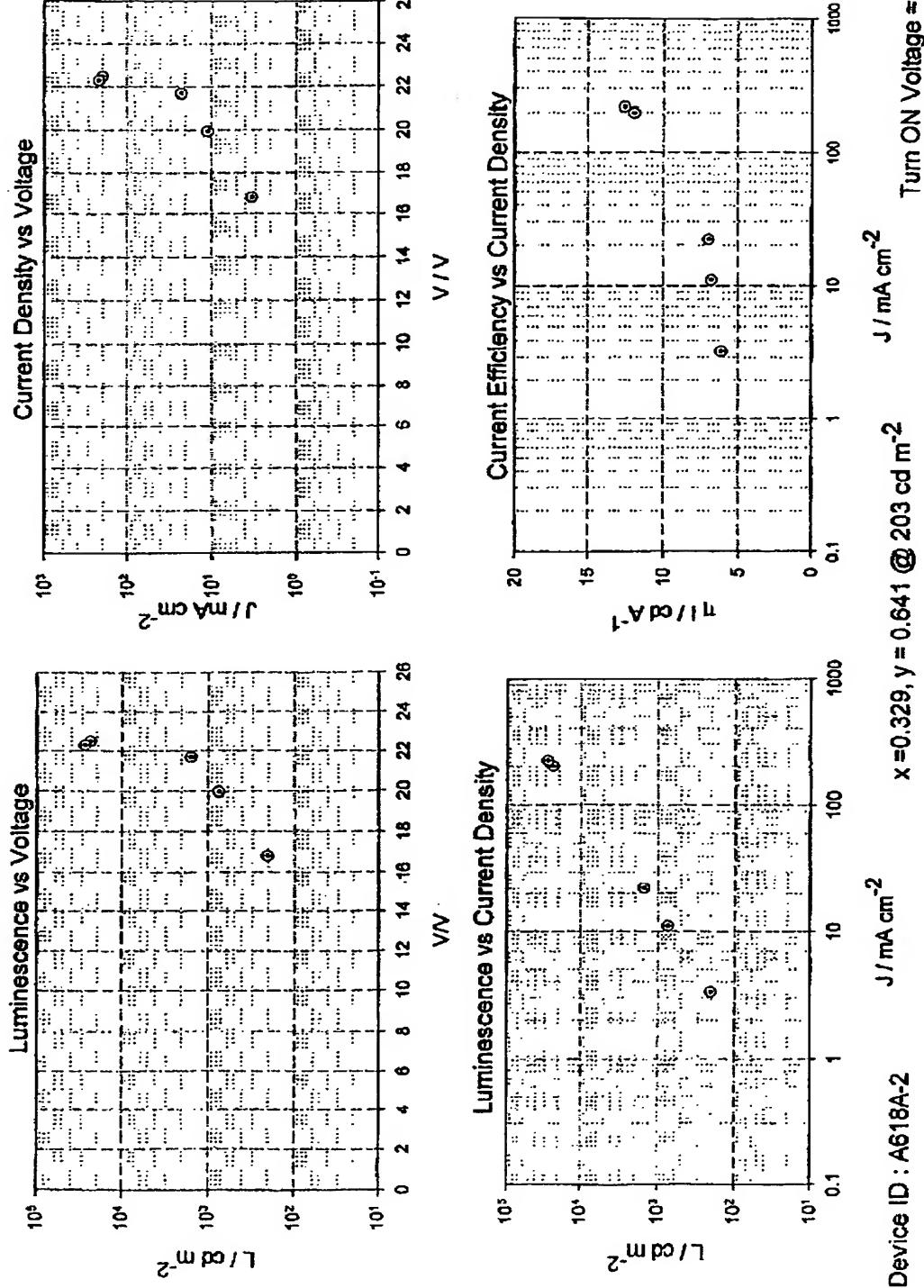
ITO (H)/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Znq₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 22

23/49

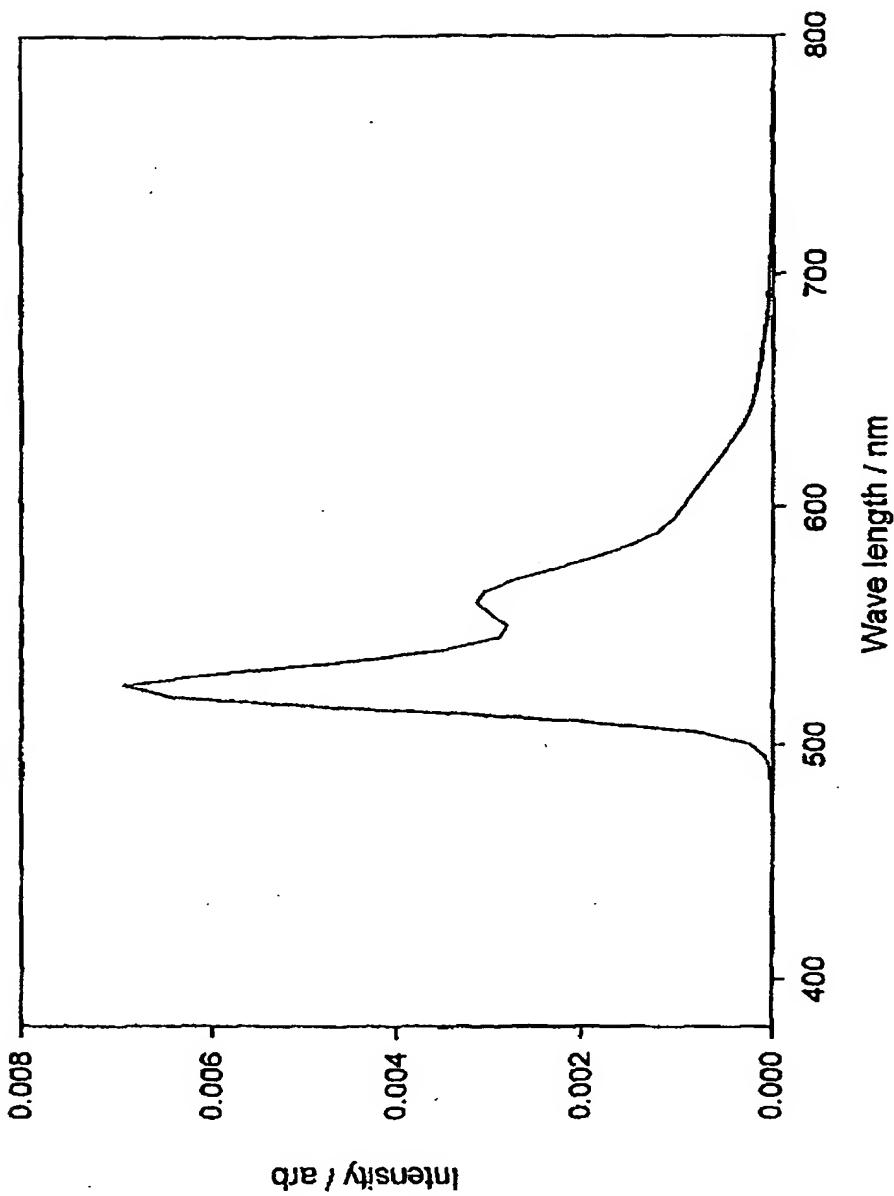
ITO (H)/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zr₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al $x = 0.329, y = 0.641 @ 203 \text{ cd m}^{-2}$

Fig. 23

24/49

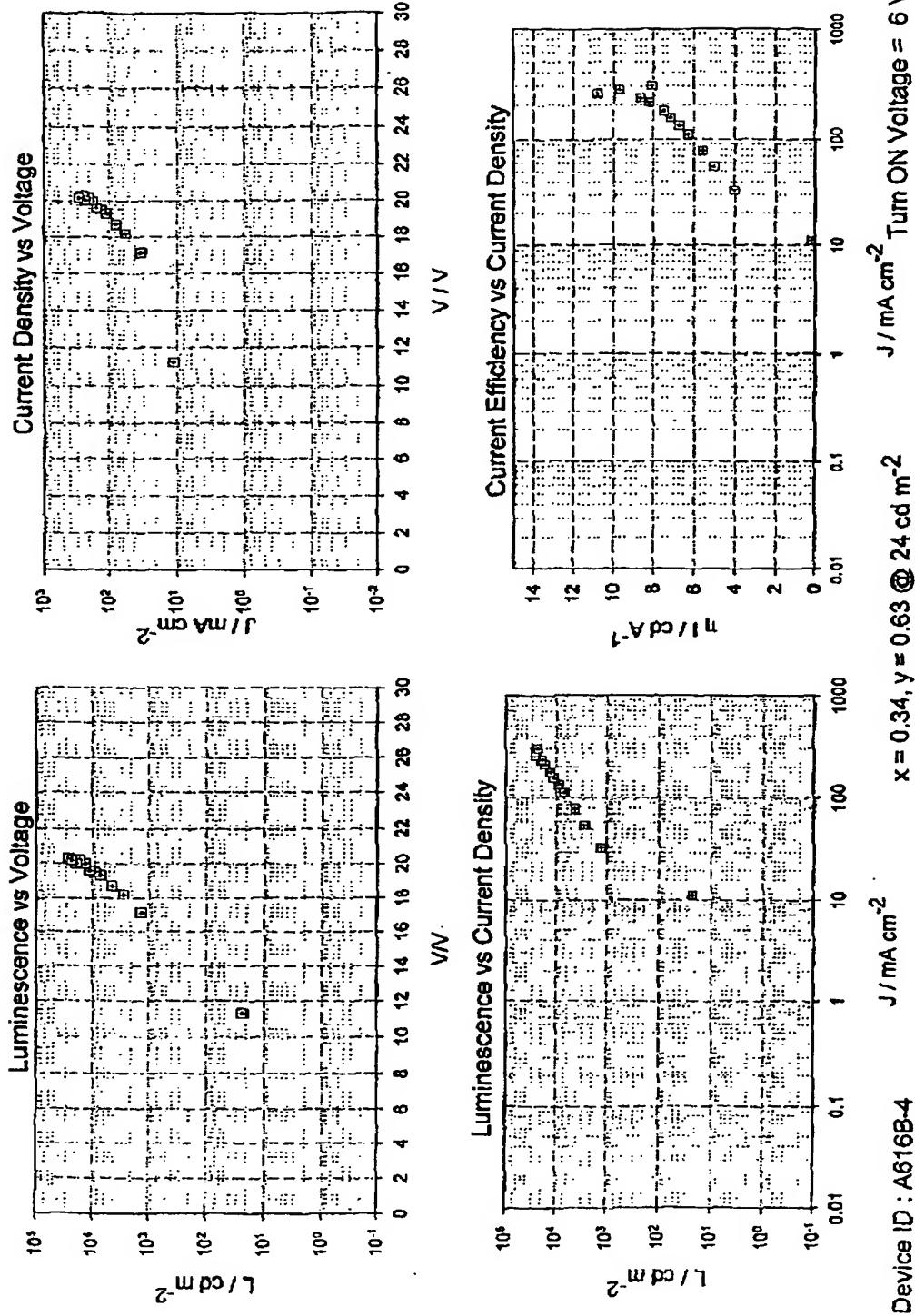
ITO (H)/CuPc (25 nm)/ α -NPB (75 nm)ZnO (10 nm)/ZnO (10 nm)/LiF (0.4 nm)/Al

Fig. 24

25/49

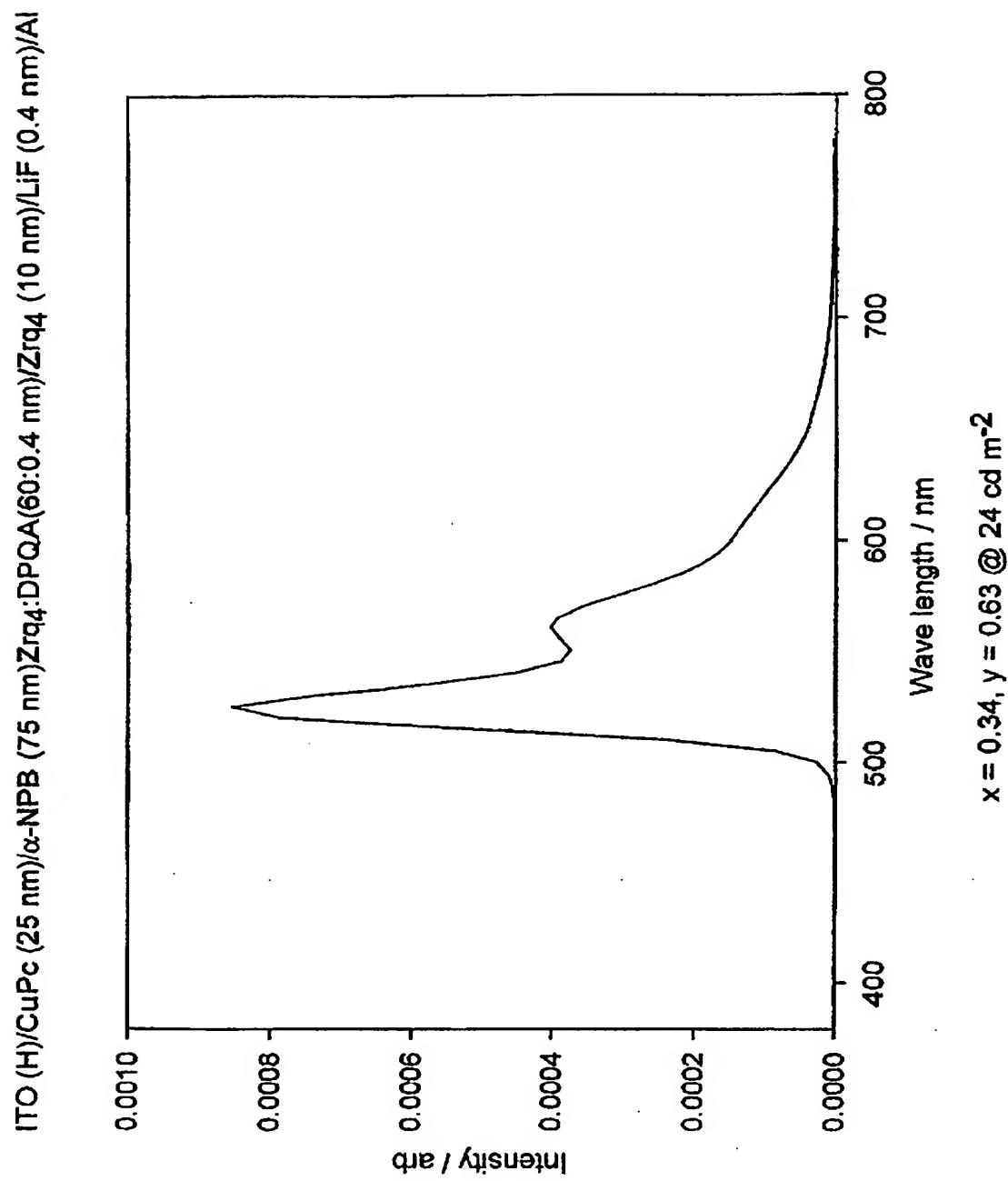


Fig. 25

26/49

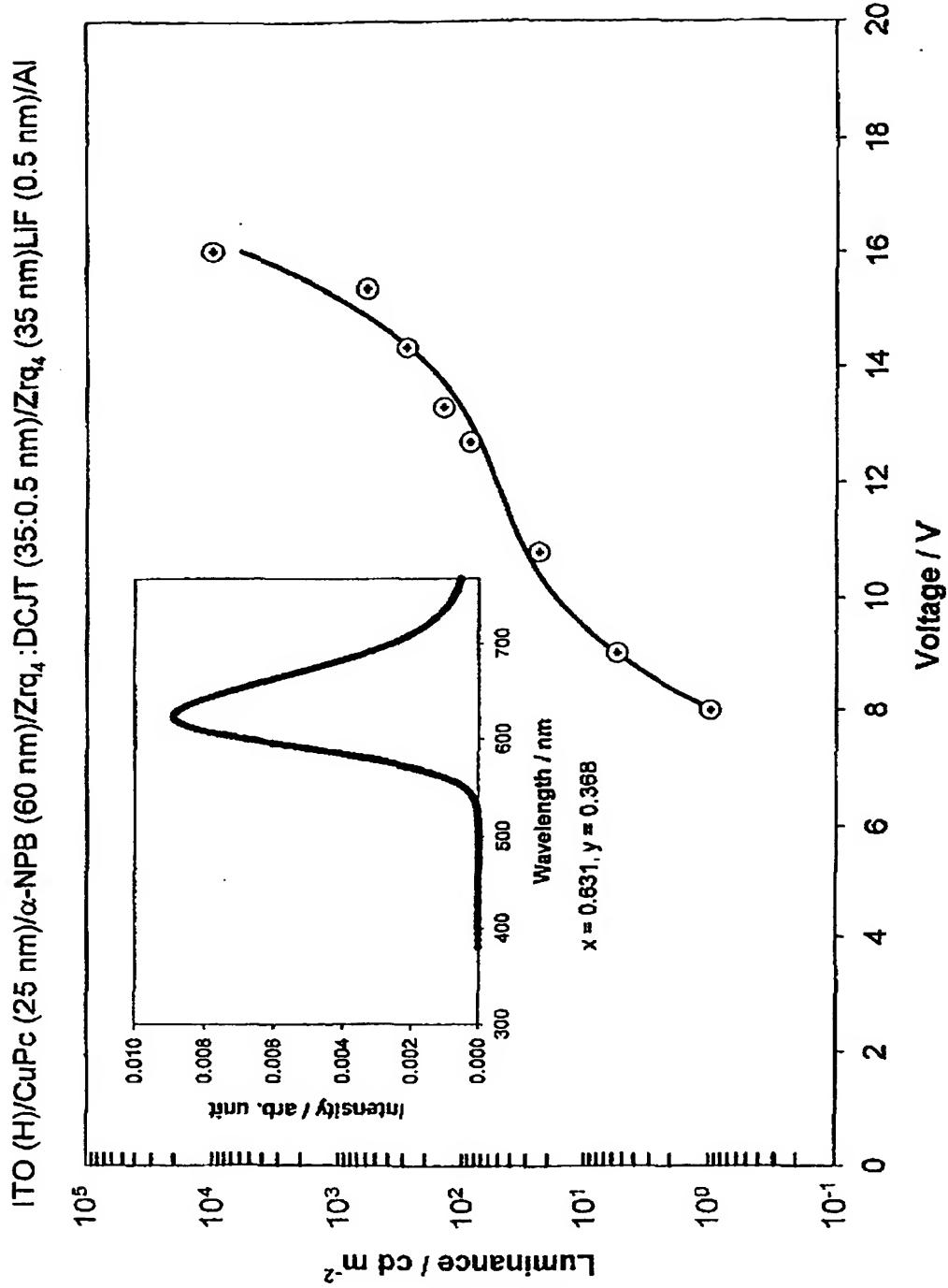


Fig. 26

27/49

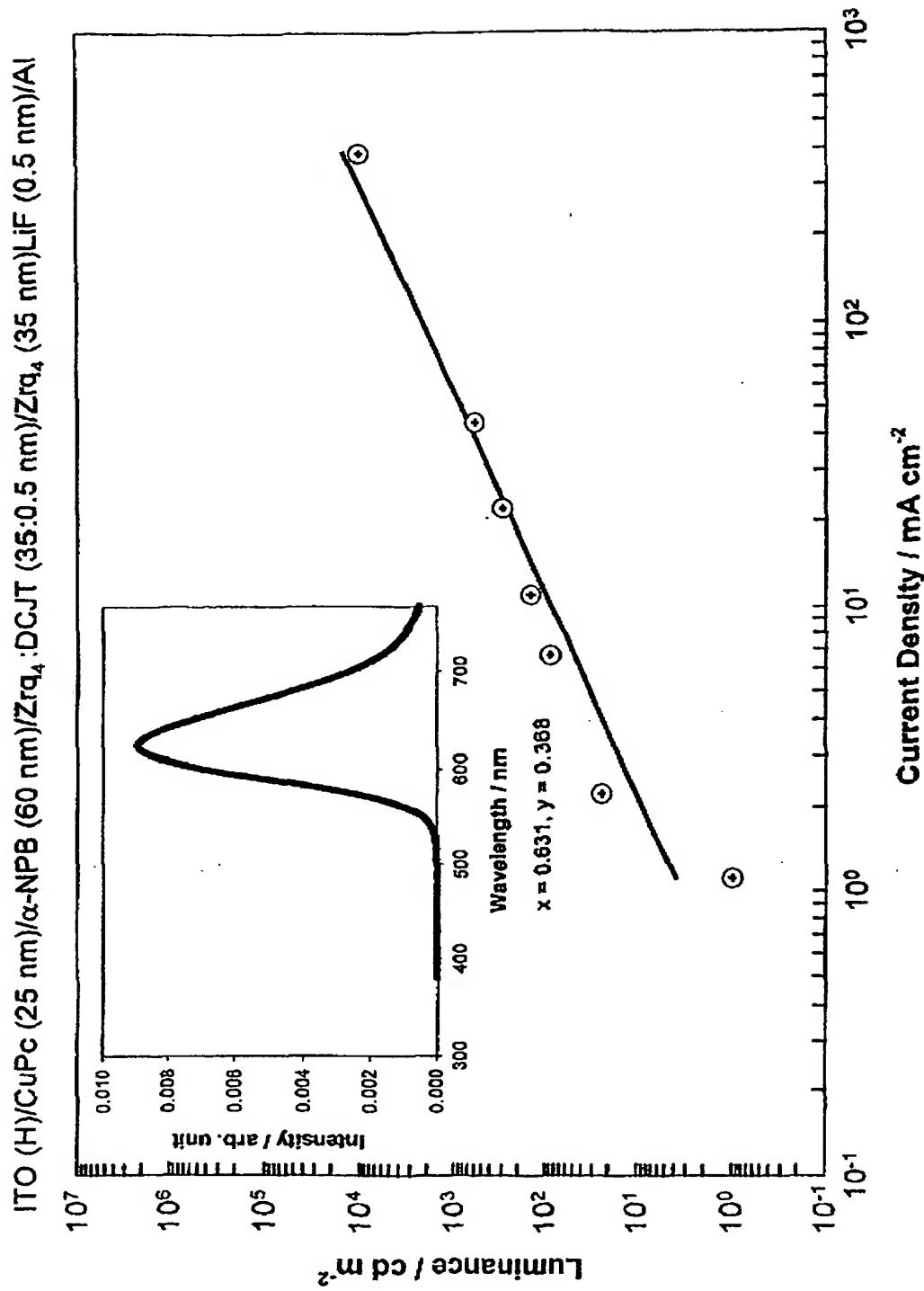


Fig. 27

28/49

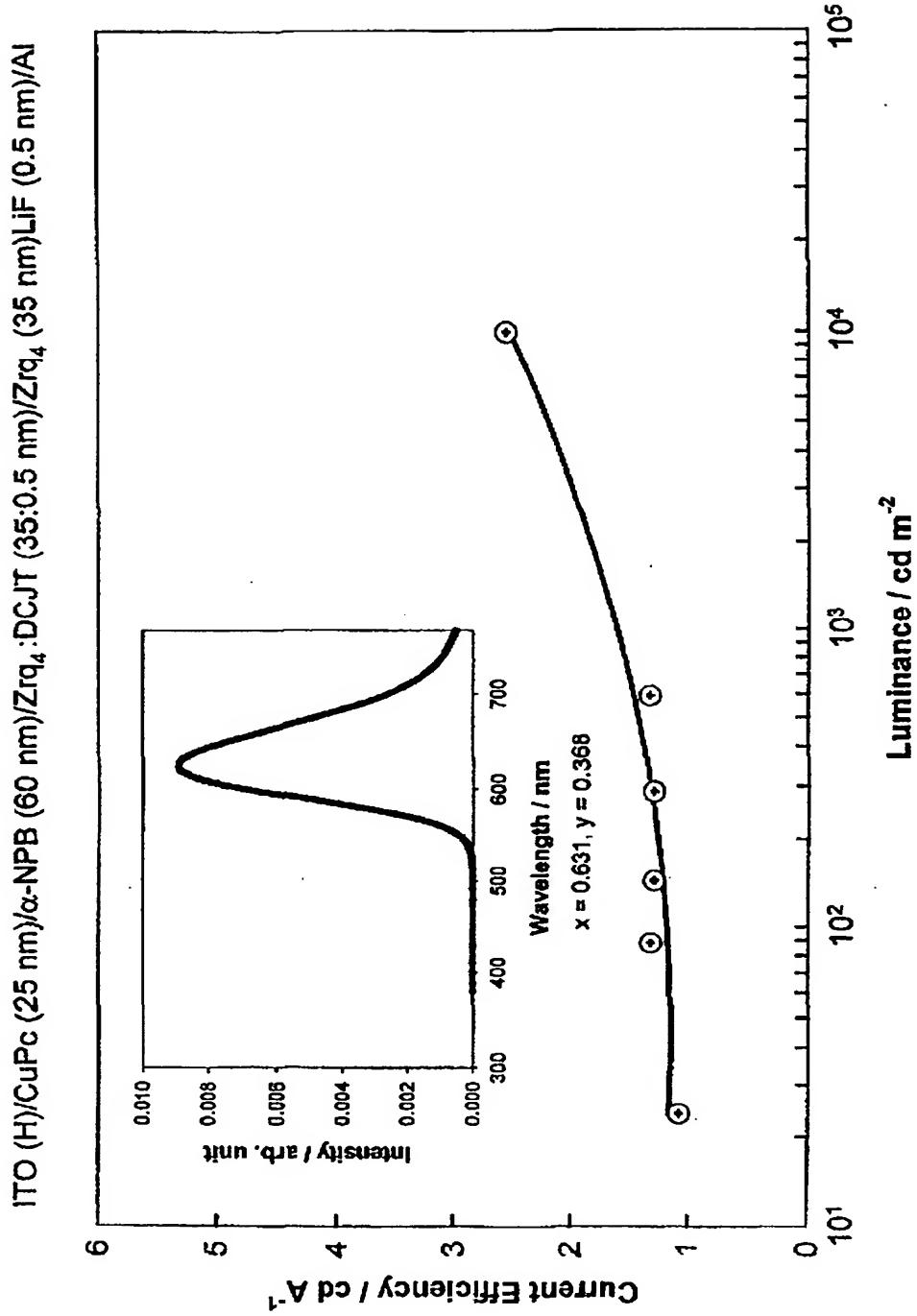


Fig. 28

29/49

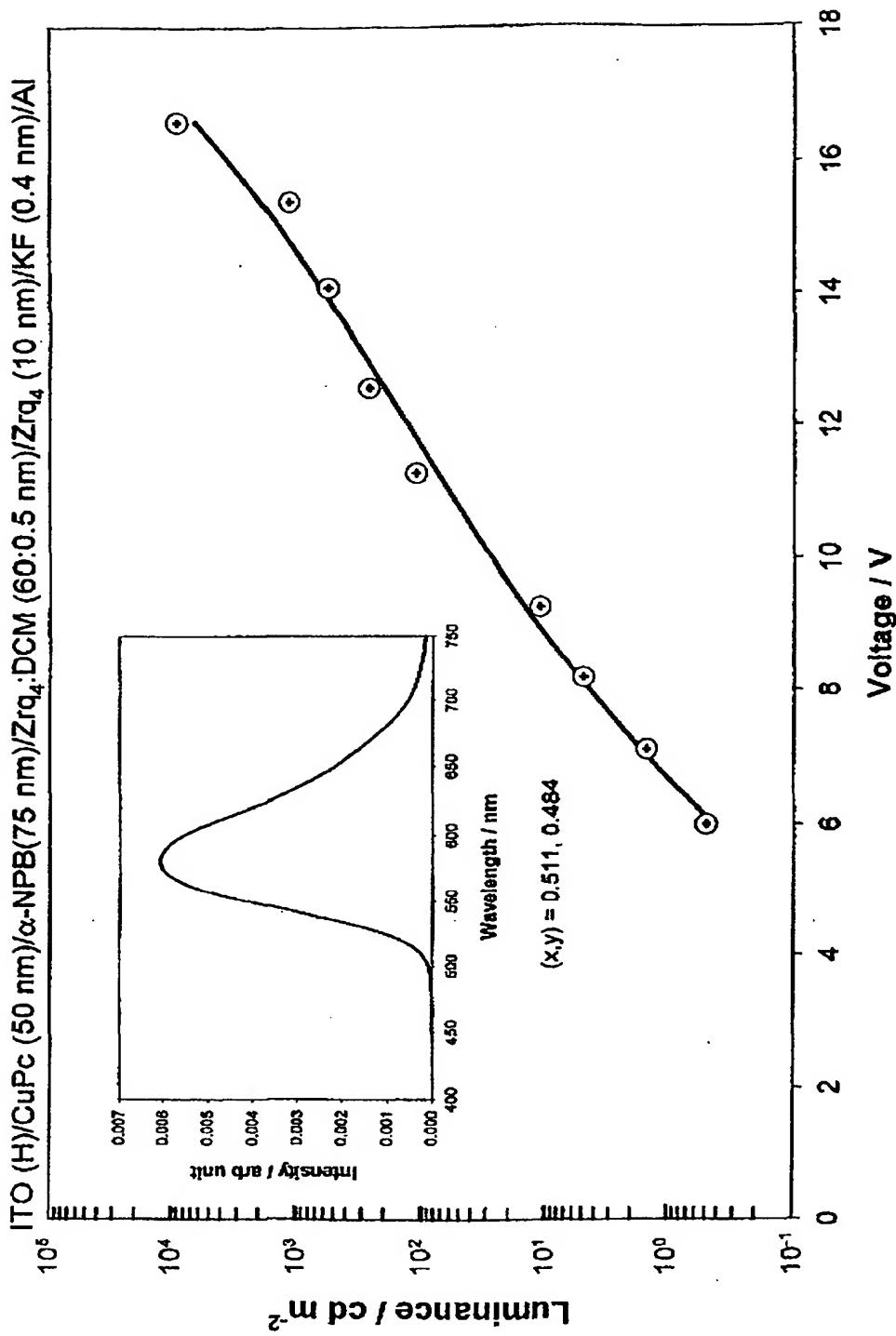


Fig. 29

30/49

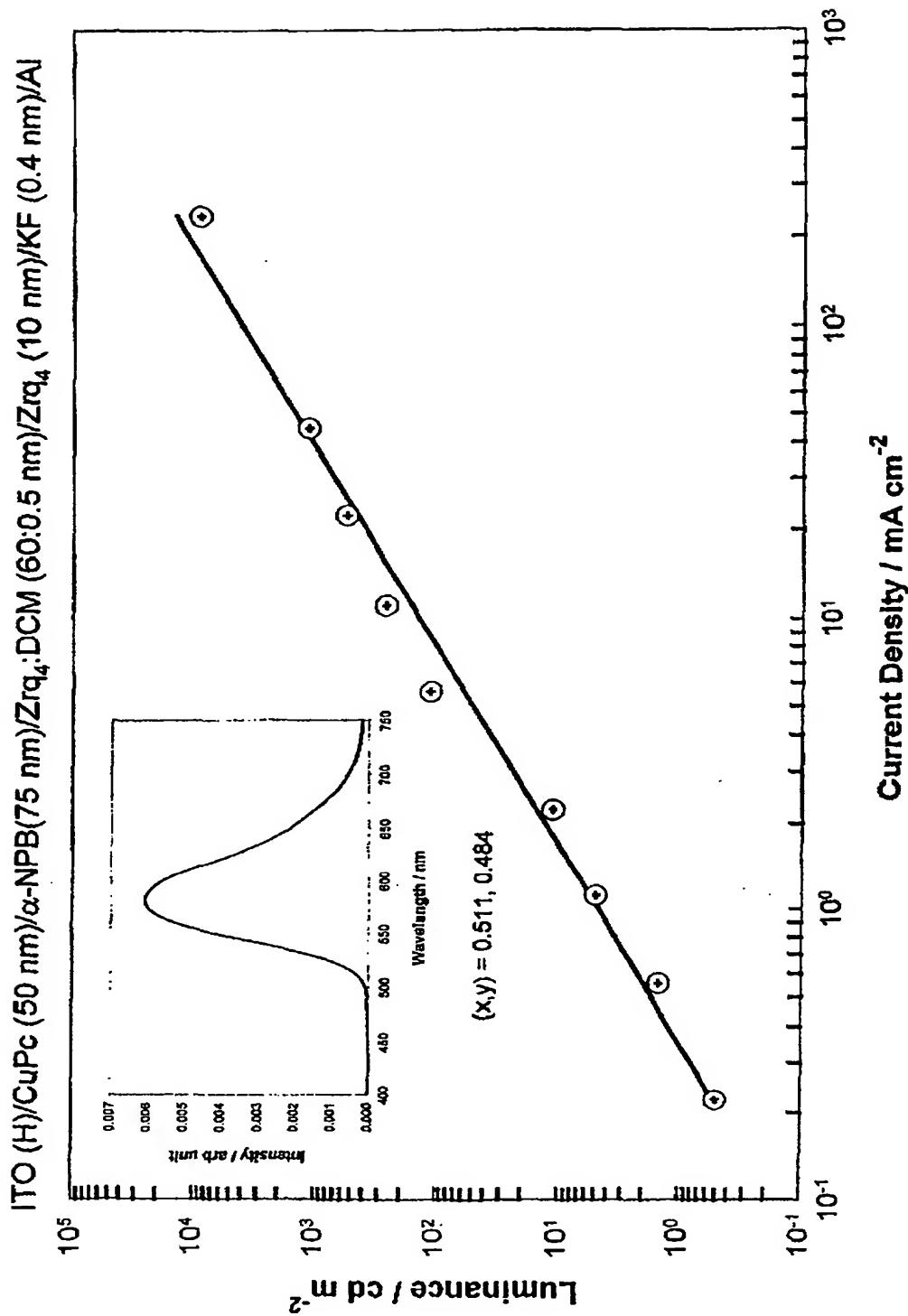


Fig. 30

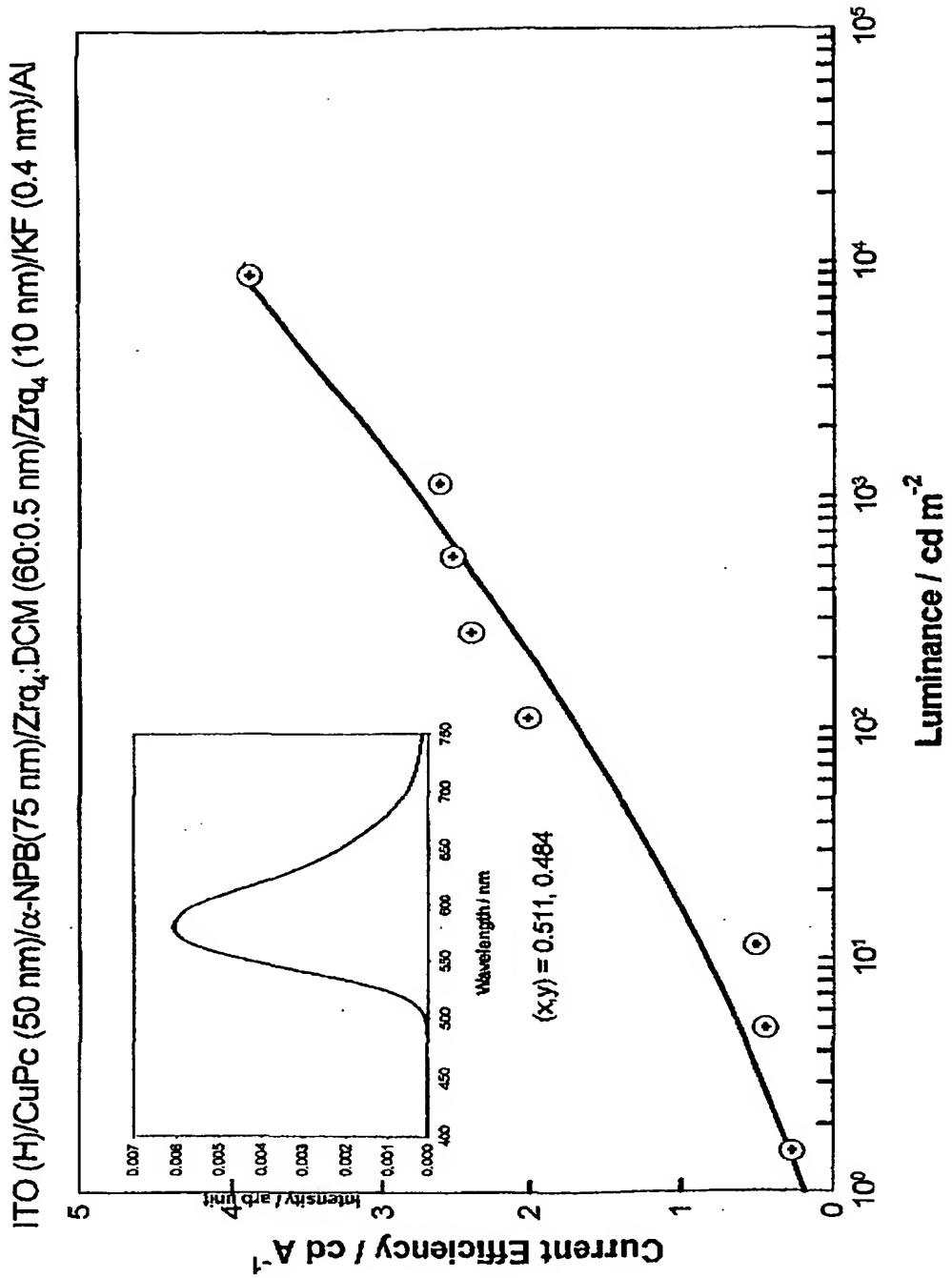


Fig. 31

32/49

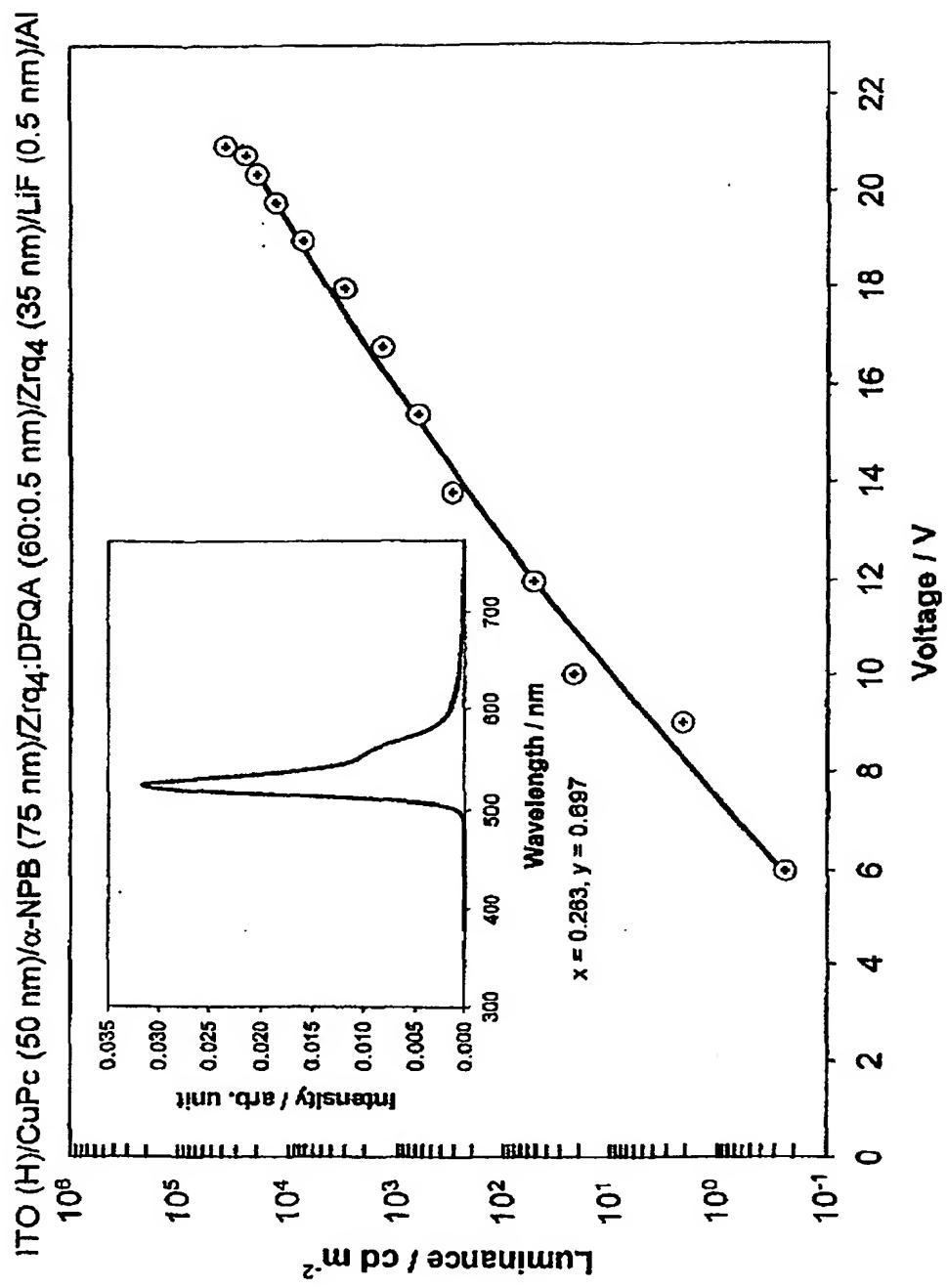


Fig. 32

33/49

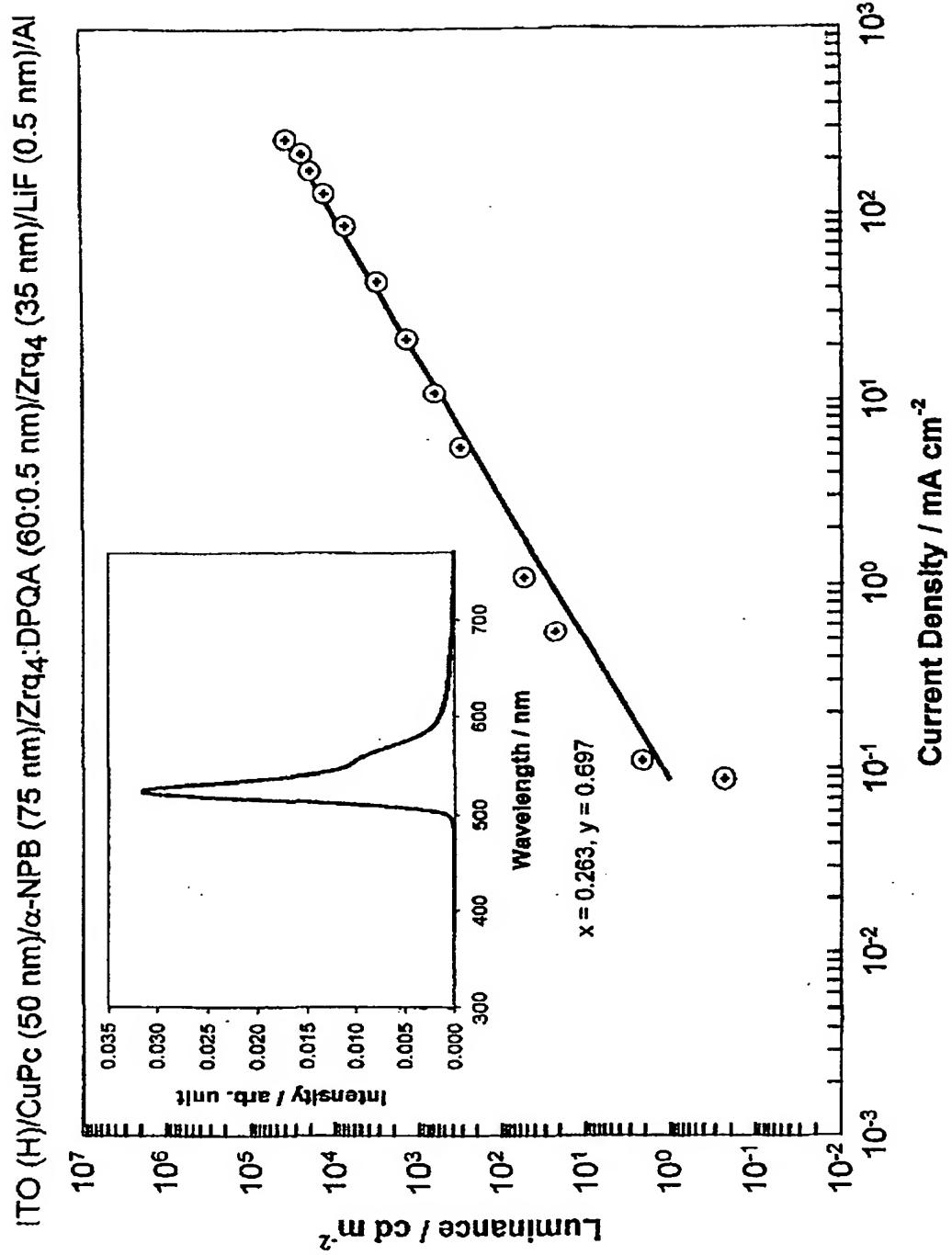


Fig. 33

34/49

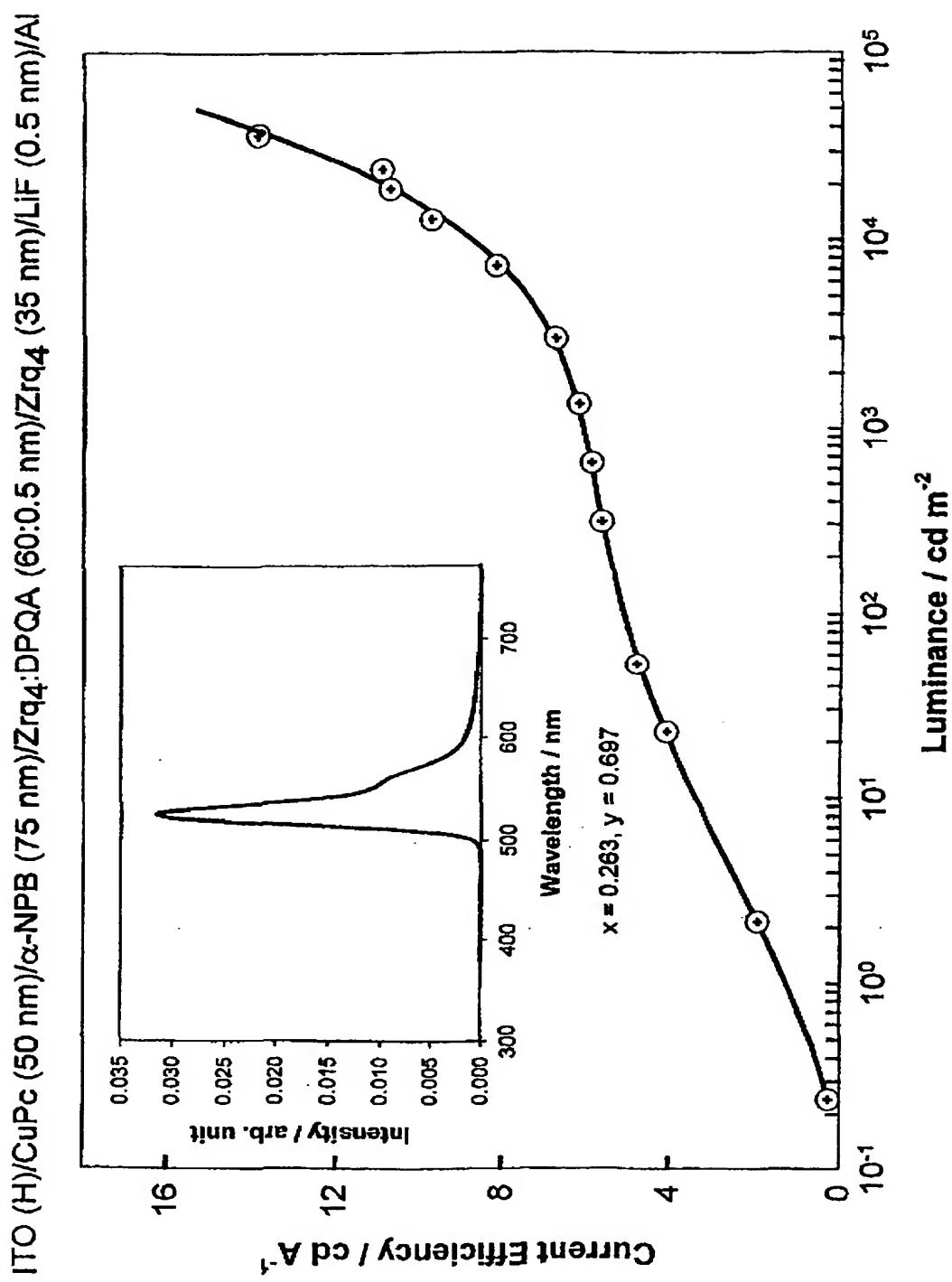


Fig. 34

35/49

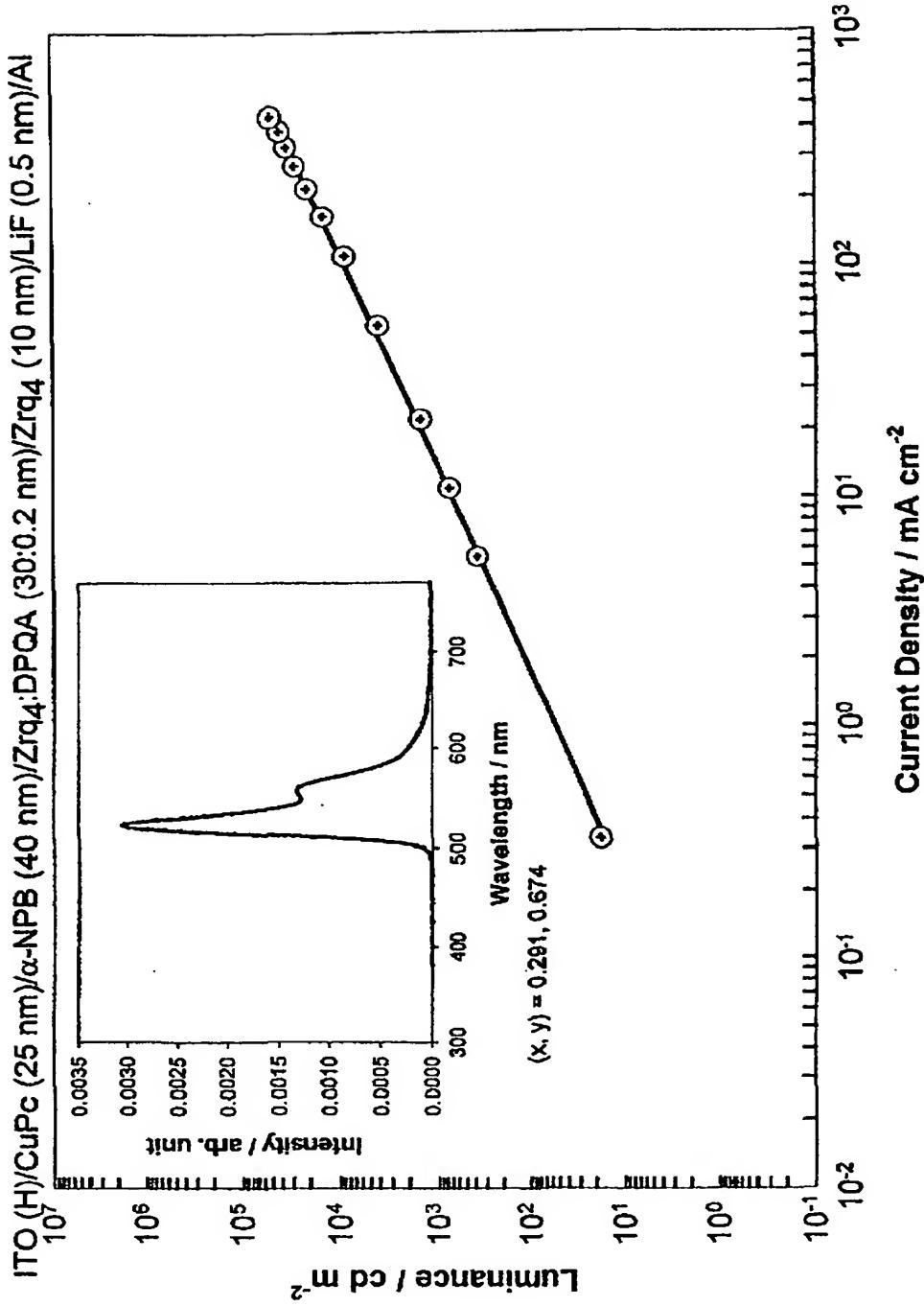


Fig. 35

36/49

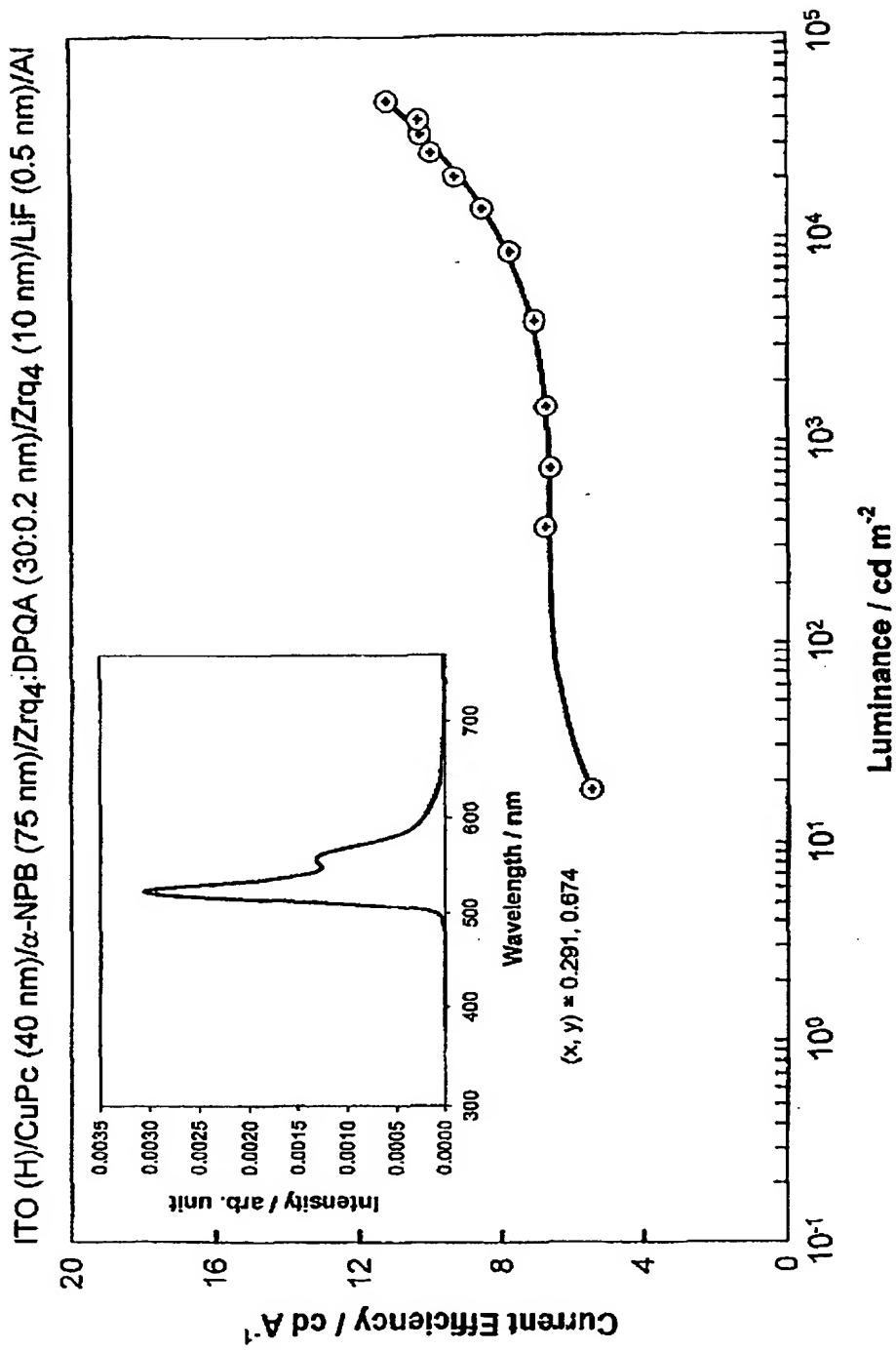
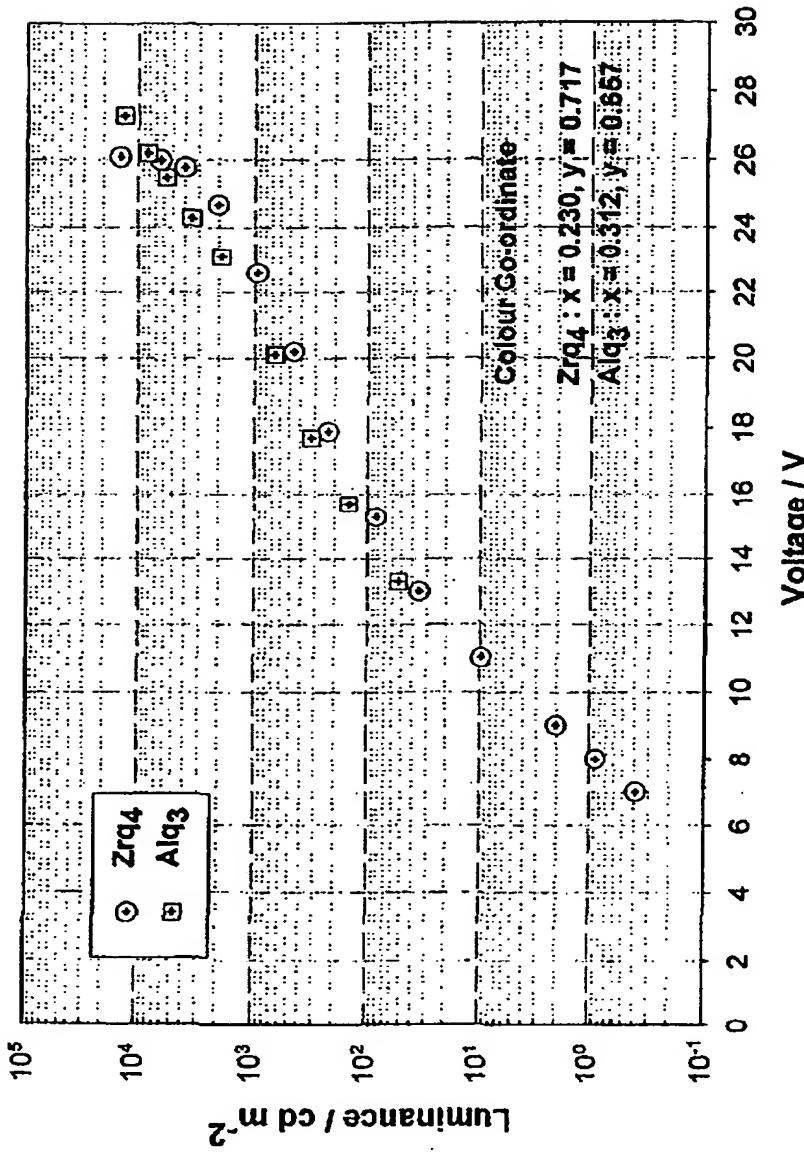


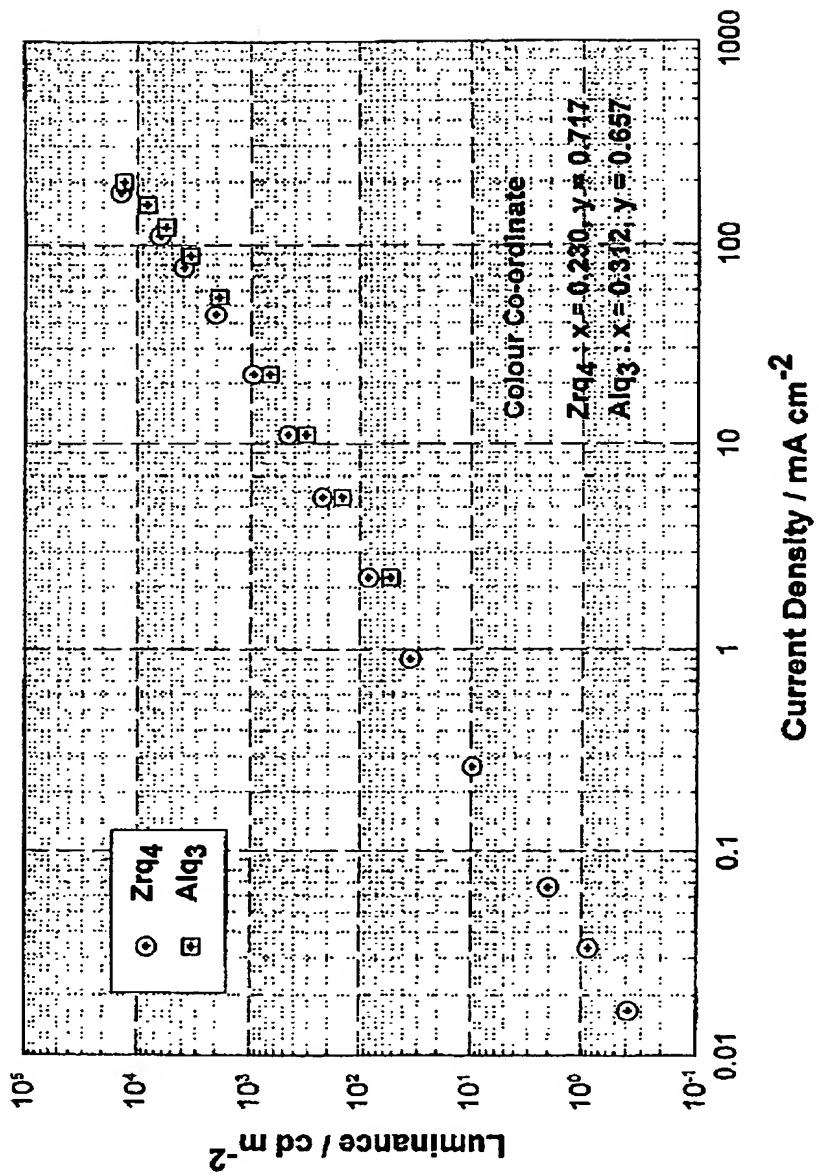
Fig. 36

Comparison of Doped Zrq4 Device with Doped Alq3 Device

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.76 nm)/LiF (0.4 nm)/Al
ITO/CuPc (50 nm)/ α -NPB (76 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 37

Comparison of Doped Zrq4 Device with Doped Alq3 Device

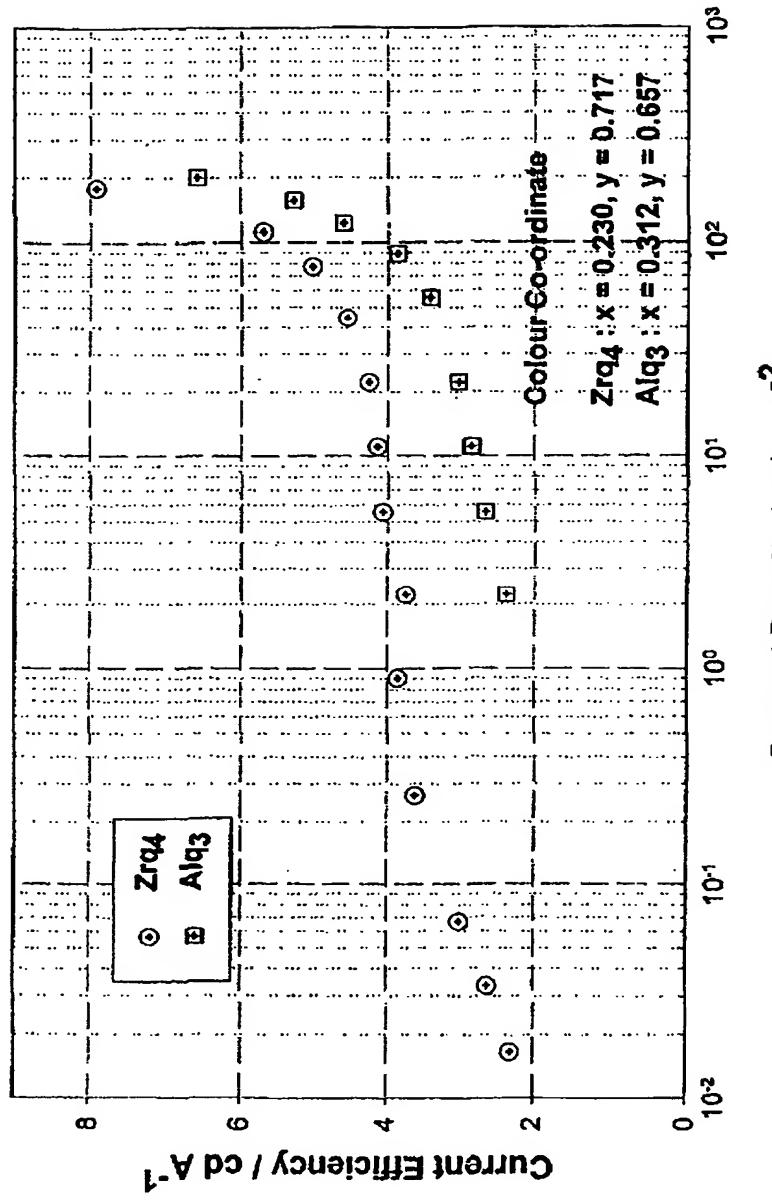


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LiF (0.4 nm)/Al

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 38

Comparison of Doped Zrq4 Device with Doped Alq3 Device

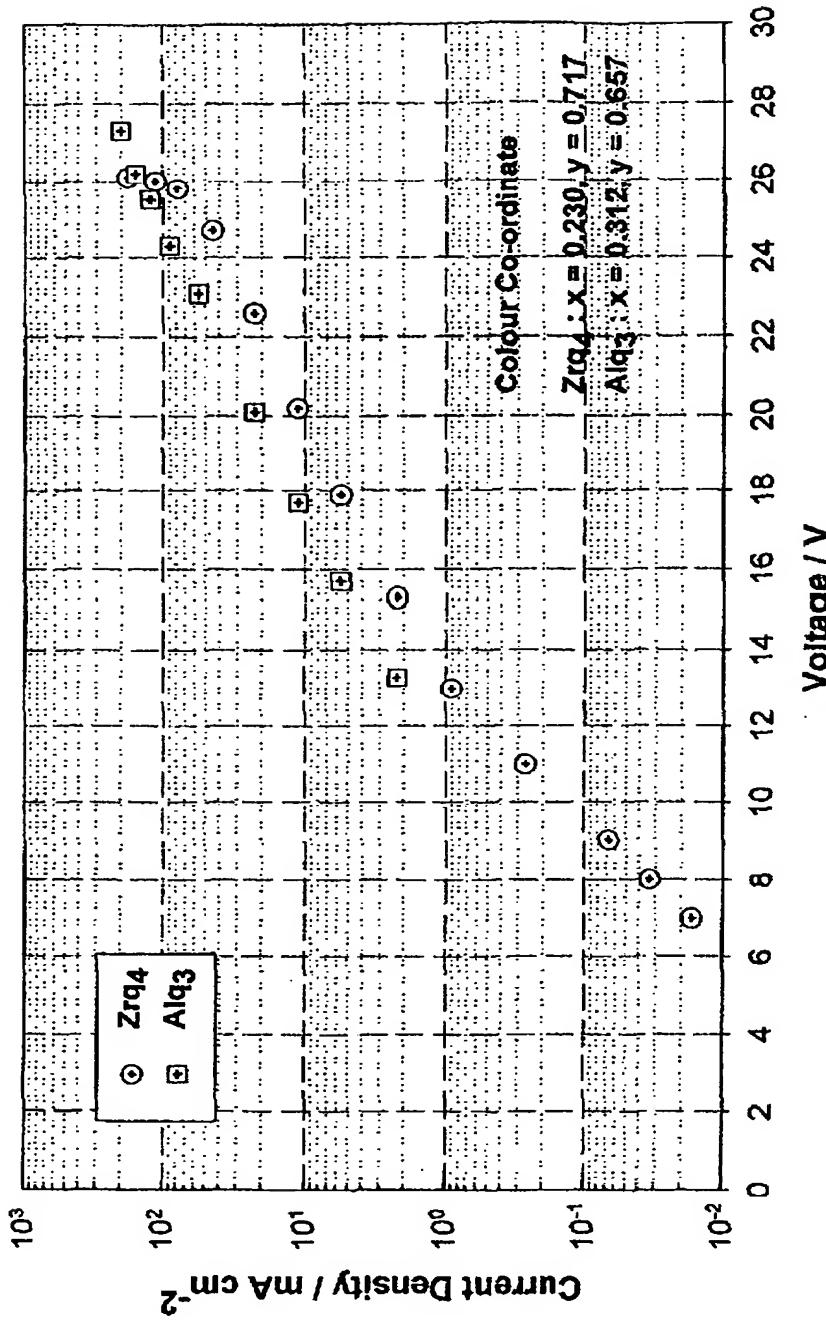


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LiF (0.4 nm)/Al

ITO/CuPc (60 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 39

Comparison of Doped Zrq4 Device with Doped Alq3 Device



ITO/CuPc (50 nm)/ α -NPB (76 nm)/Alq3 : DPQA (75 : 0.75 nm)/Zrq4 (10 nm)/LiF (0.4 nm)/Al
ITO/CuPc (50 nm)/ α -NPB (76 nm)/Zrq4 : DPQA (60 : 0.5 nm)/Zrq4 (10 nm)/LiF (0.4 nm)/Al

Fig. 40

41/49

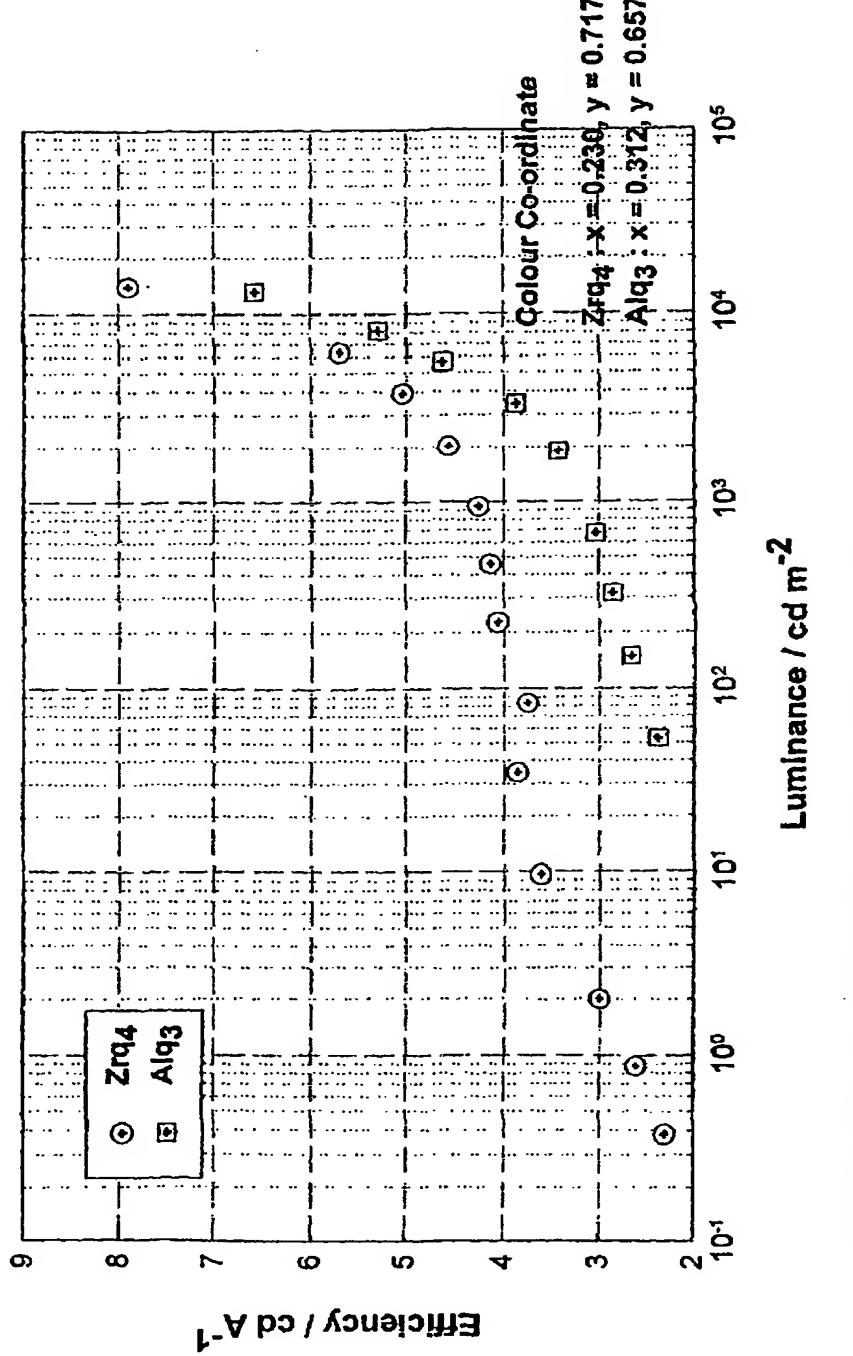
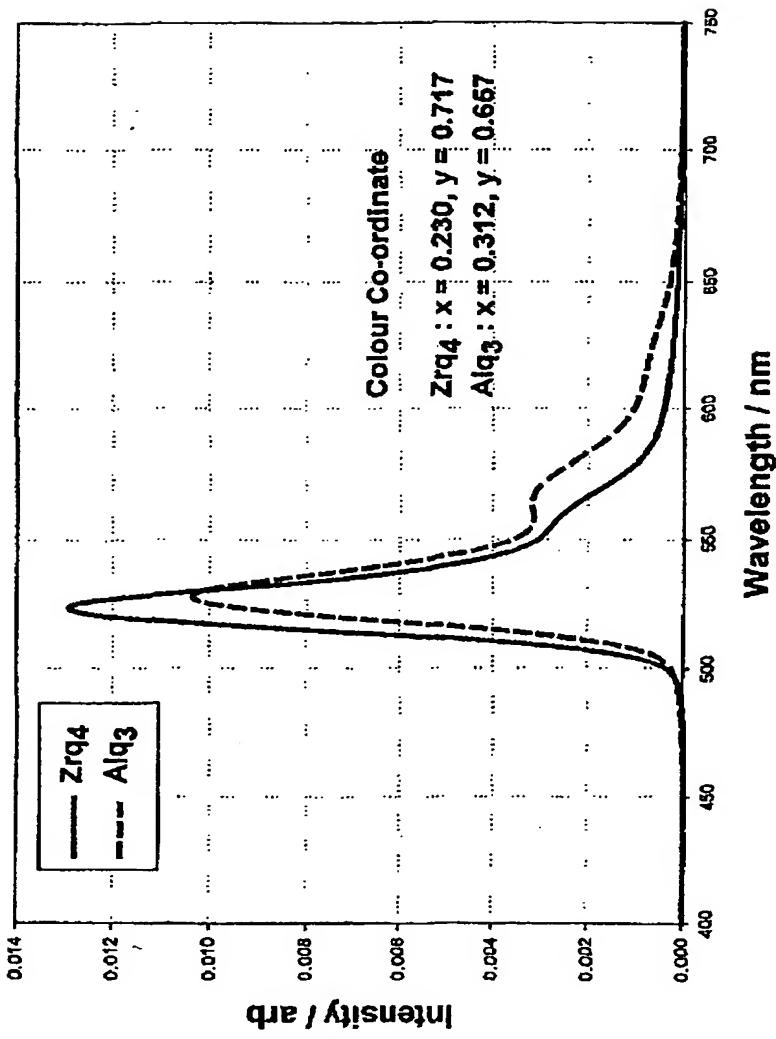
Comparison of Doped Zr_q4 Device with Doped Al_q3 Device

Fig. 41

42/49

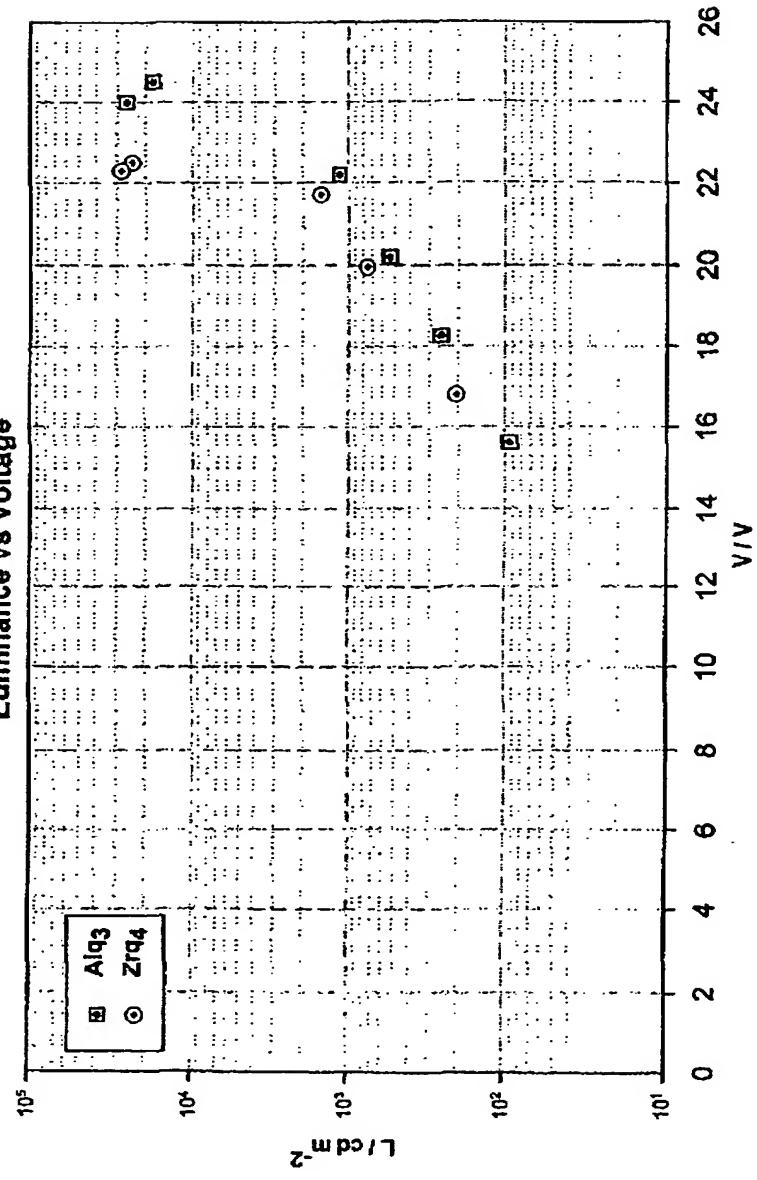
Comparison of Doped Zrq4 Device with Doped Alq3 Device

ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃ : DPQA (75 : 0.75 nm)/Alq₃ (10 nm)/LiF (0.4 nm)/Al
ITO/CuPc (50 nm)/ α -NPB (75 nm)/Zrq₄ : DPQA (60 : 0.5 nm)/Zrq₄ (10 nm)/LiF (0.4 nm)/Al

Fig. 42

43/49

**Comparison of Doped Alq₃ Device with
Doped Zrq₄ Device**

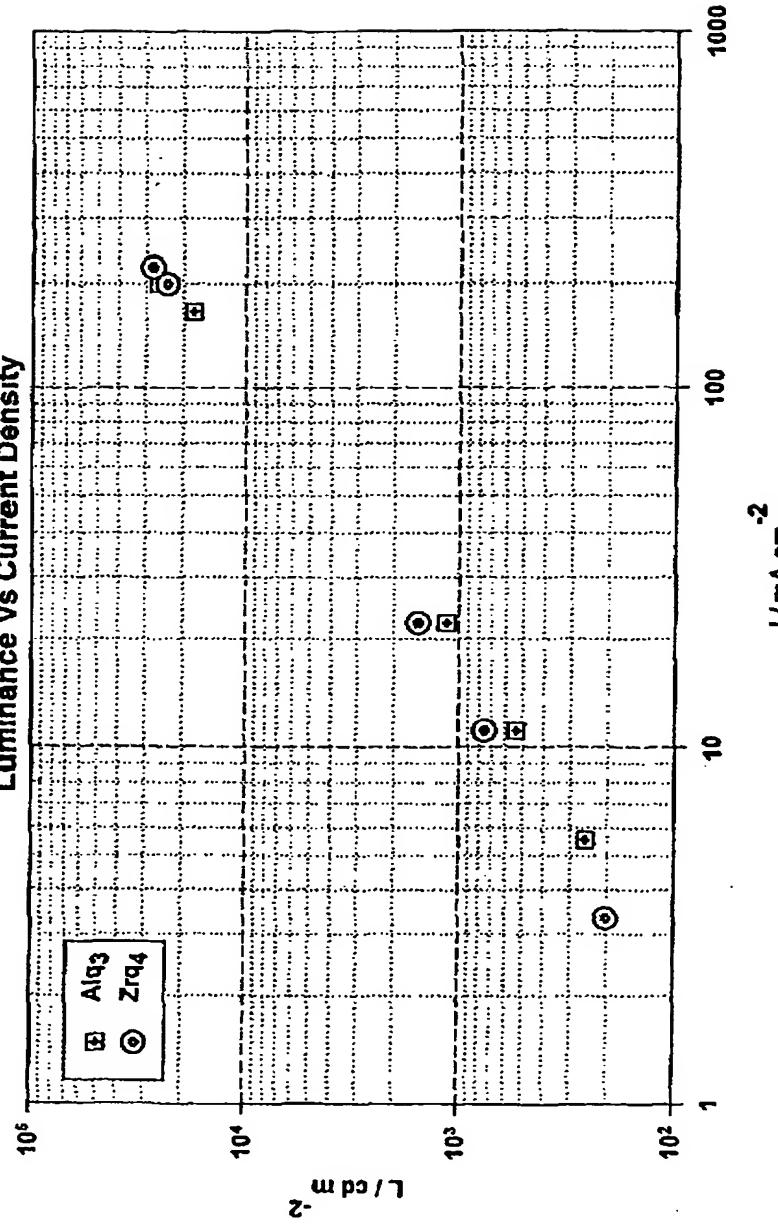


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zrq₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 43

44/49

**Comparison of Doped Alq₃ Device with
Doped Zrq₄ Device**

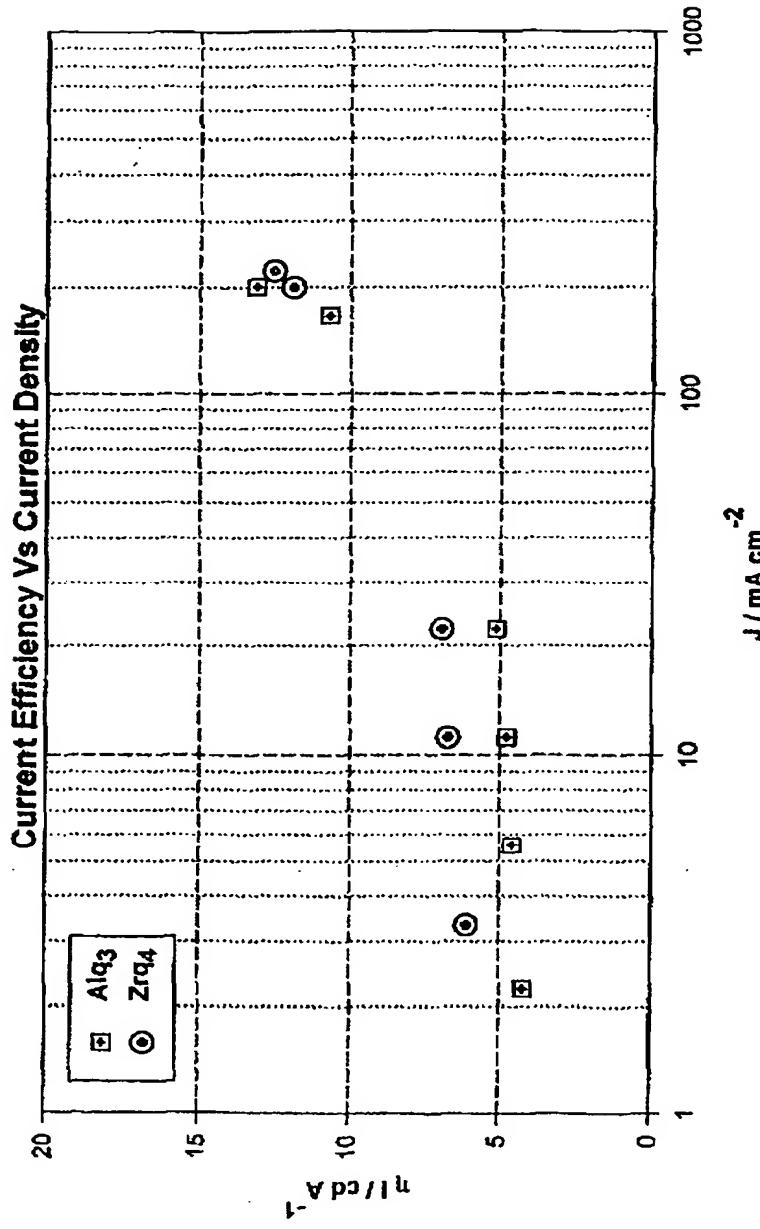


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zrq₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 44

45/49

Comparison of Doped Alq₃ Device with Doped Zrq₄ Device

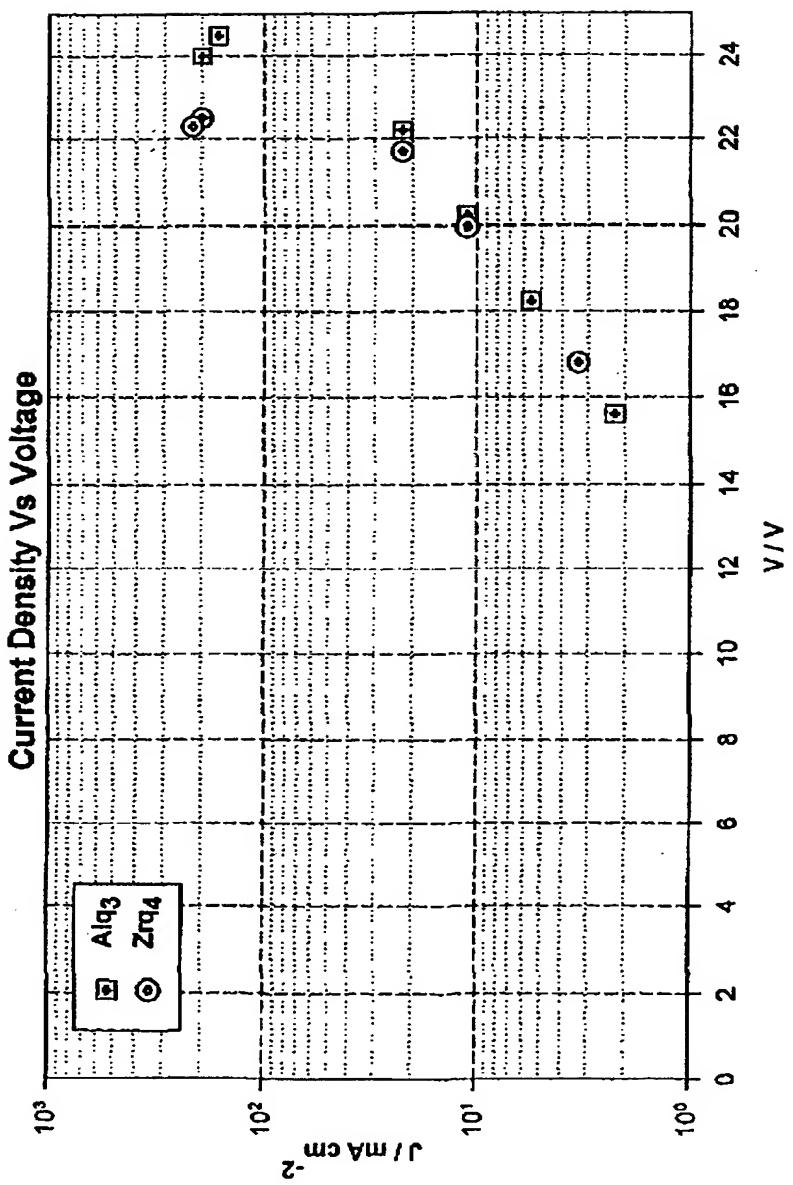


ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/Zrq₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 45

46/49

Comparison of Doped Alq₃ Device with Doped Zrq₄ Device



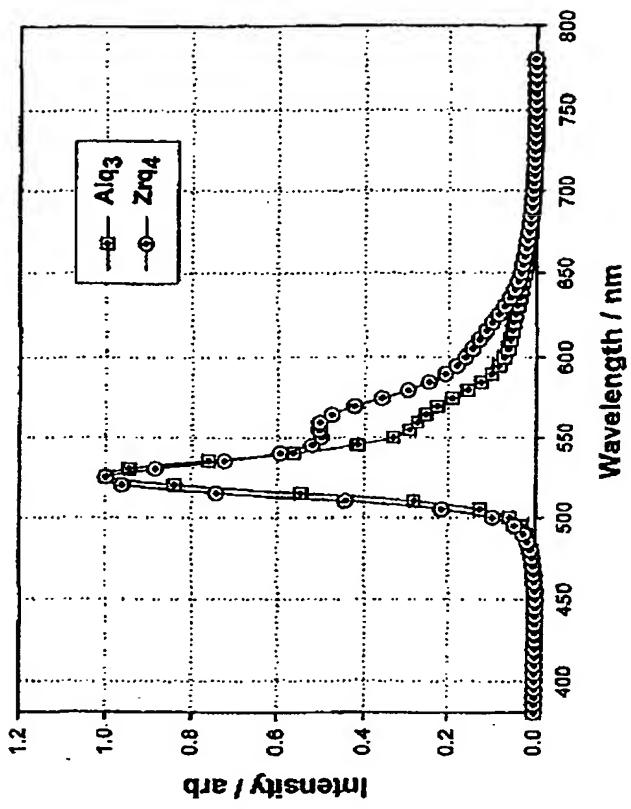
ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al

ITO/CuPc:TPTP (15:15 nm)/ α -NPB (75 nm)/LiF (0.2 nm)/Al

Fig. 46

47/49

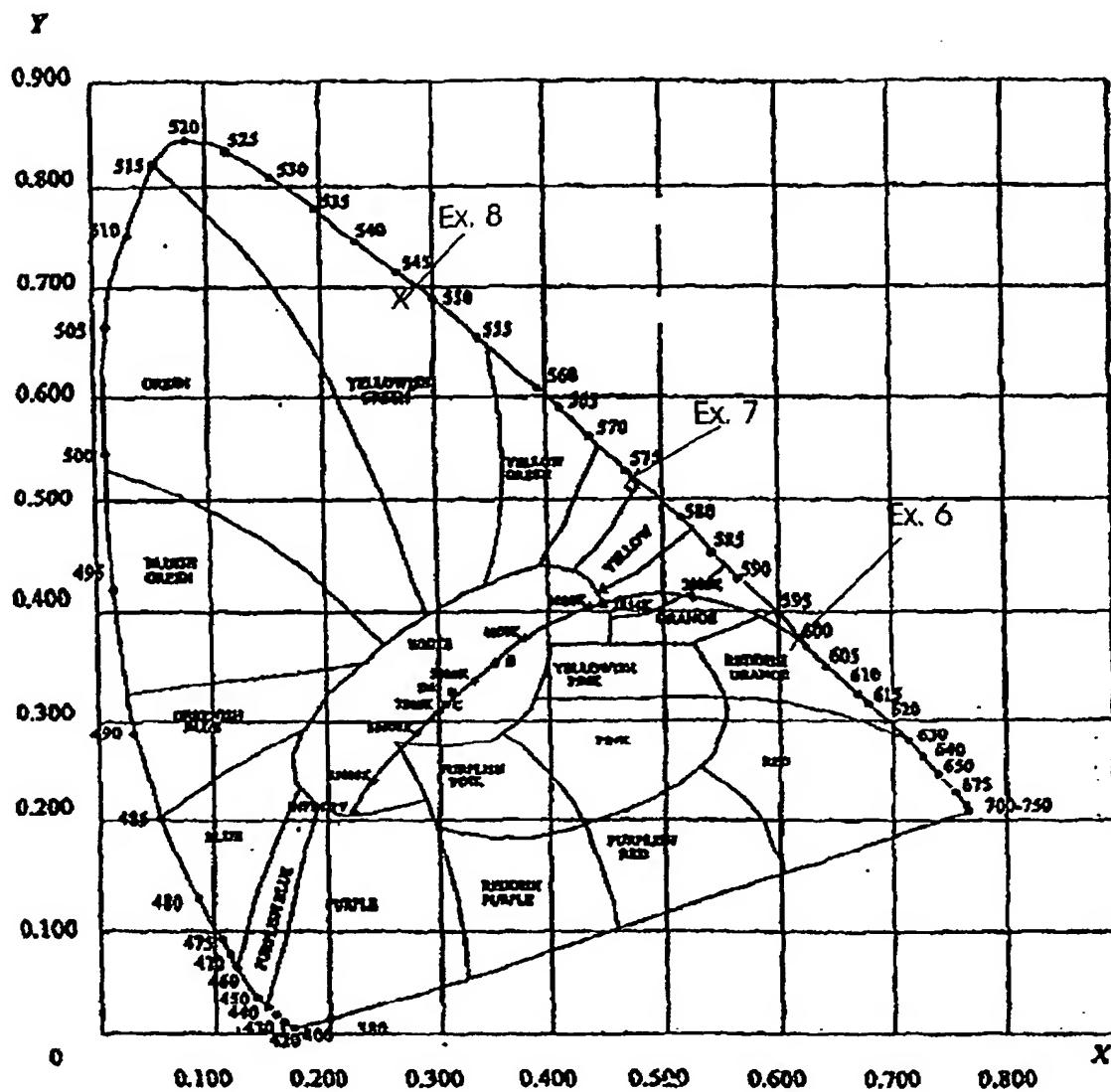
Comparison of Doped Alq_3 Device with Doped ZrQ_4 Device



ITO/CuPc (50 nm)/ α -NPB (75 nm)/Alq₃:DPQA (75:0.75 nm)/Alq₃ (10 nm)/LiF (0.2 nm)/Al
ITO/CuPc:TPTP (15:1.5 nm)/ α -NPB (75 nm)/ZrQ₄:DPQA (60:0.5 nm)/LiF (0.2 nm)/Al

Fig. 47

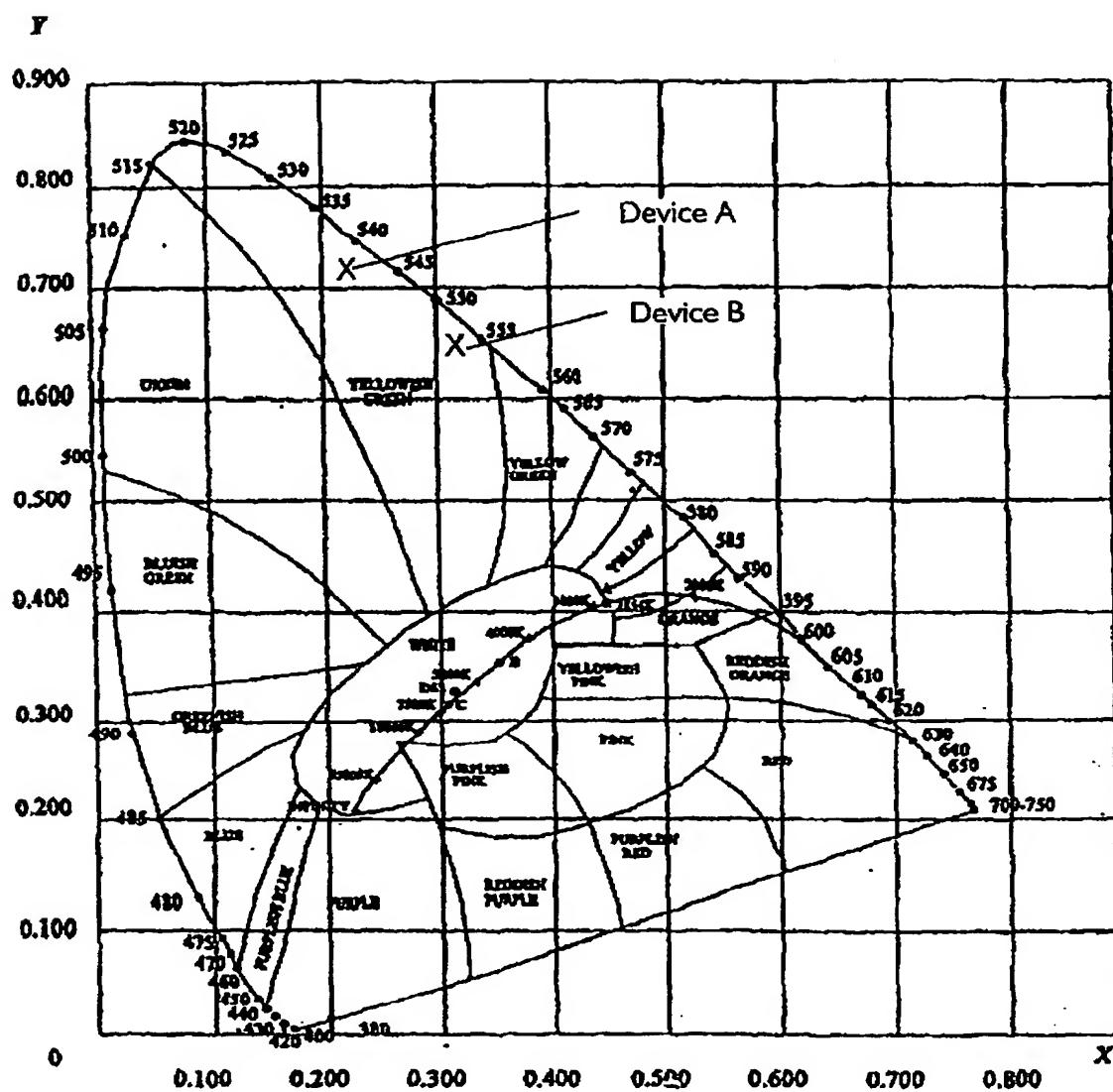
48/49



CIE 1931 x,y chromaticity diagram showing approximate position of perceived colours

Fig. 48

49/49



CIE 1931 x,y chromacity diagram showing approximate position of perceived colours

Fig. 49

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